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Cover photograph: An adult female psocid *Stenopsocus immaculatus* (Stephens). (Photo: Alby Oakshott).

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THE SWARMING ORIENTATION OF *FANNIA ARMATA* (DIPTERA: FANNIIDAE)

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ABSTRACT

Observations of the swarming behaviour of *Fannia armata* (Meigen) were undertaken in two woods in Northamptonshire (VC32), during June and July 2008. *Fannia armata* was found to swarm from at least 08.00h to 20.00h. The swarms comprised males and had a maximum size of 20 formed at low level from 0.5–3.5 m close to broadleaved tree trunks. Individuals in each swarm faced in the same direction. The swarms as a whole were found to face away from the sun whilst maintaining a constant bearing to the sun, which is a suggested mating strategy. In addition to the sun, wind velocity and direction also influenced swarm orientation, but the structure of the wood was not found to be a factor.

INTRODUCTION

The Fanniidae (Diptera: Calyptratae) consist of small to medium sized, from 2–9 mm, mostly grey to black bodied flies (Oosterbroek, 2006). Although distributed worldwide, this is a small family comprising approximately 260 described species. There are 82 known European species, with 60 species recorded in the UK (Rozkošný, Gregor & Pont, 1997).

Males of almost all fanniid species form swarms that can often be observed in sunny conditions, keeping station beneath overhanging tree branches and above woodland paths (d'Assis-Fonseca, 1968). Associated females can usually be swept from low vegetation in the vicinity (d'Assis-Fonseca, 1968; Oosterbroek, 2006). Both sexes are attracted to the sap of broadleaved trees and also to honeydew, and aggregate on plants infested by aphids (Rozkošný, Gregor & Pont, 1997).

Fannia armata (Meigen), the subject of this paper, has a Eurosiberian distribution, being generally distributed and very common within Britain, with a recorded flight period from May to October (d'Assis-Fonseca, 1968; Rozkošný, Gregor & Pont, 1997). Its developmental cycle is not known, but the larvae are distinctly saprophagous and have been found in cesspools, latrines and dung-hills (Rozkošný, Gregor & Pont, 1997). Measuring from 3.5–5.5mm long, the adults can be aggressive secretophages, molesting cattle in pastures and attracted to human perspiration. *Fannia armata* can be identified with Rozkošný, Gregor & Pont (1997), which covers European, including all the British fanniid species and uses current names, while d'Assis-Fonseca (1968) keys British Muscidae (including *Fannia*) using older names but is useful as a second key.

Observations of individual swarms of *F. armata* revealed that when hovering, all individuals within the swarm faced in the same direction, which appeared to be related to the bearing of the sun from the swarming site. Moreover, this relative bearing also appeared to remain constant throughout the day. To investigate further this aspect of swarming behaviour, observations were made to test the null hypothesis that *F. armata* swarms are randomly orientated. This paper presents the

results of these observations and discusses possible influences on swarm orientation. Virtually all information about swarms is worth recording (Sullivan, 1981) and the opportunity was therefore taken to note other aspects of the swarming habits of *F. armata*.

Methods

The major part of this study took place within Delapre Woods (SP755582); a 15 ha mixed woodland on the southern boundary of Northampton (VC32) containing oak (*Quercus* spp.), sweet chestnut (*Castanea sativa*), sycamore (*Acer pseudoplatanus*), beech (*Fagus* sp.) and various conifers. Visits were also made to Everdon Wood (SP605566); part of a 29 ha ancient woodland located in west Northamptonshire (VC32) comprising ash (*Fraxinus excelsior*), oak (*Quercus* spp.), field maple (*Acer campestre*), sweet chestnut and sycamore. Both sites contain significant amounts of standing and fallen deadwood.

Visits were made to Delapre Woods and Everdon Wood at various times between approximately 08.00h to 20.00h, during June and July 2008. The opportunity was also taken to carry out behavioural observations during a recording trip by the Northants and Peterborough Diptera Group to Pitsford Reserve (SP774710), a small wood adjacent to Pitsford reservoir (VC32), although only a single record was obtained from this location. A Sanyo ICT-B29X digital voice recorder, which has an integral digital counter with a 1-second resolution, a Garmin EtrexH (high sensitivity) handheld GPS, a Silva Ranger 3 compass and the open source Graphical Information System (GIS) GRASS (Neteler & Mitasova, 2008) were all used to record swarming behaviour. Swarm location, height, the number of flies comprising the swarm, the date and time of the observation, the main hovering bearing, the sun bearing and any obvious swarm markers were all recorded. Any other factors that may have influenced the hovering bearing were also recorded. The recorded notes were transferred to a spreadsheet and the GPS data downloaded to the GIS following each trip. The use of GPS data and a GIS enabled the distribution of the swarming sites to be mapped and allowed revisits to be made to individual sites with confidence. The hovering bearing is defined as the direction in which the insect's head was pointing, relative to magnetic north. Observations ceased when the species was no longer found in Delapre Woods.

Results

In order to obtain independent data, an effort was made to locate as many sites as possible. A total of 35 swarming sites were located, to which a total of 40 visits were undertaken. To determine whether the time of day or date affected the results, four of the sites were visited more than once.

All swarms were sited within three to four metres of the trunk of a deciduous tree, which was sycamore in 45% of cases. The swarming sites were usually located in glades with overhanging branches at 4–17 m above ground level. Swarming was observed from approximately 08.00h through to 20.00h.

The lower limit of the swarms was always between 0.5–1 m above ground level, with the depth of the swarms ranging from 0.5–2.5 m. The height of overhanging branches limited the height of the swarm in three cases, but at the sites with no limiting vegetation, the maximum recorded upper limit of a swarm did not exceed 3.5 m above ground level. The width of the swarms ranged from 1–4 m, depending on the number of flies present.

The swarms consisted exclusively of males and were formed over bare earth or low ground cover. Swarms each comprised from 1 to 15–20 individuals, with most (80%) swarms having ten or fewer members. Due to their small size, individuals were difficult to follow for any length of time, but appeared to spend a long time hovering, with six minutes being recorded in one case. Swarm members engaged in conspecific and heterospecific chases when other flying insects came within approximately 150 mm. Following the chases, individuals tended to return to their approximate starting position. The hovering behaviour of individual swarm members can be described as steady, rather than frenetic. Individuals did not hold a steady position as can be observed in, for example, *Episyrphus balteatus* (De Geer) (Alderman, 2008) and *Syrphus ribesii* (L.) swarms, but moved side to side by up to 150mm, about an approximate station. Individuals within each swarm held a common dominant hovering bearing, with small direction changes, ranging 10–35 degrees either side of the dominant bearing, being made every one to three seconds. Individuals hovered head up, at an angle of 10–20 degrees. The swarms dispersed when approached within one metre by a human observer.

Relative to the bearing of the sun from the swarming sites, the dominant hovering bearings split into two classes: clockwise and anti-clockwise. Applying a Spearman's rank correlation test to each class revealed a significant relationship between the recorded bearings of the sun and both the clockwise ($r=0.908$, $n=18$, $P<0.05$) and the anti-clockwise hovering bearings ($r=0.929$, $n=21$, $P<0.05$).

The recorded dominant bearings of the swarms relative to the bearing of the sun at the swarming sites were categorised as 'positive-relative' if between 1–180 degrees clockwise from the sun and as 'negative-relative' if between 1–180 degrees anti-clockwise from the sun (Fig. 1). The recorded orientations varied between positive-relative 95–170 degrees and negative-relative 95–170 degrees, never facing into the sun (<90 degrees relative) and never completely away from the sun (180 degrees relative). Figure 1 gives a graphical representation of the relative hovering bearings. A Chi square test for goodness of fit revealed no significant difference between the number of recorded positive- and negative-relative bearings ($\chi^2=0.024$, d.f. $=1$, $P>0.05$). The mean positive relative bearing was 142 degrees and the mean negative-relative bearing 126 degrees. The difference between the median positive- and median negative-relative bearings was significant at $P<0.05$, but not significant at $P>0.01$ (Mann-Whitney U test with $U=134$, nPos $=20$, nNeg $=21$). A z score, with an applied correction factor for rank ties, was also significant at $P<0.05$, but not significant at $P>0.01$ ($z=-0.206$).

Discussion

The results revealed that *F. armata* swarms in the study woods faced away from the sun (Fig. 1). As the bearing of the sun from the swarming sites varied during the day, the dominant bearing of the swarms relative to the bearing of the sun was maintained. All records were made when *F. armata* was swarming in the sun. Due to its small size and dark colouring, the species became near invisible when the sun was behind cloud and reliable readings could not be taken, but when this happened, the swarm bearings were seen to vary. On return of the sun, the bearings held steady. Other possible causes of swarms holding a particular bearing include alignment to the direction of paths and the wind direction. All bar two of the swarming sites were within two metres of a path, but this was solely due to the majority of observations being made from paths. The paths were not straight and the swarms were all aligned at different bearings with respect to the paths. Only by chance did the swarm

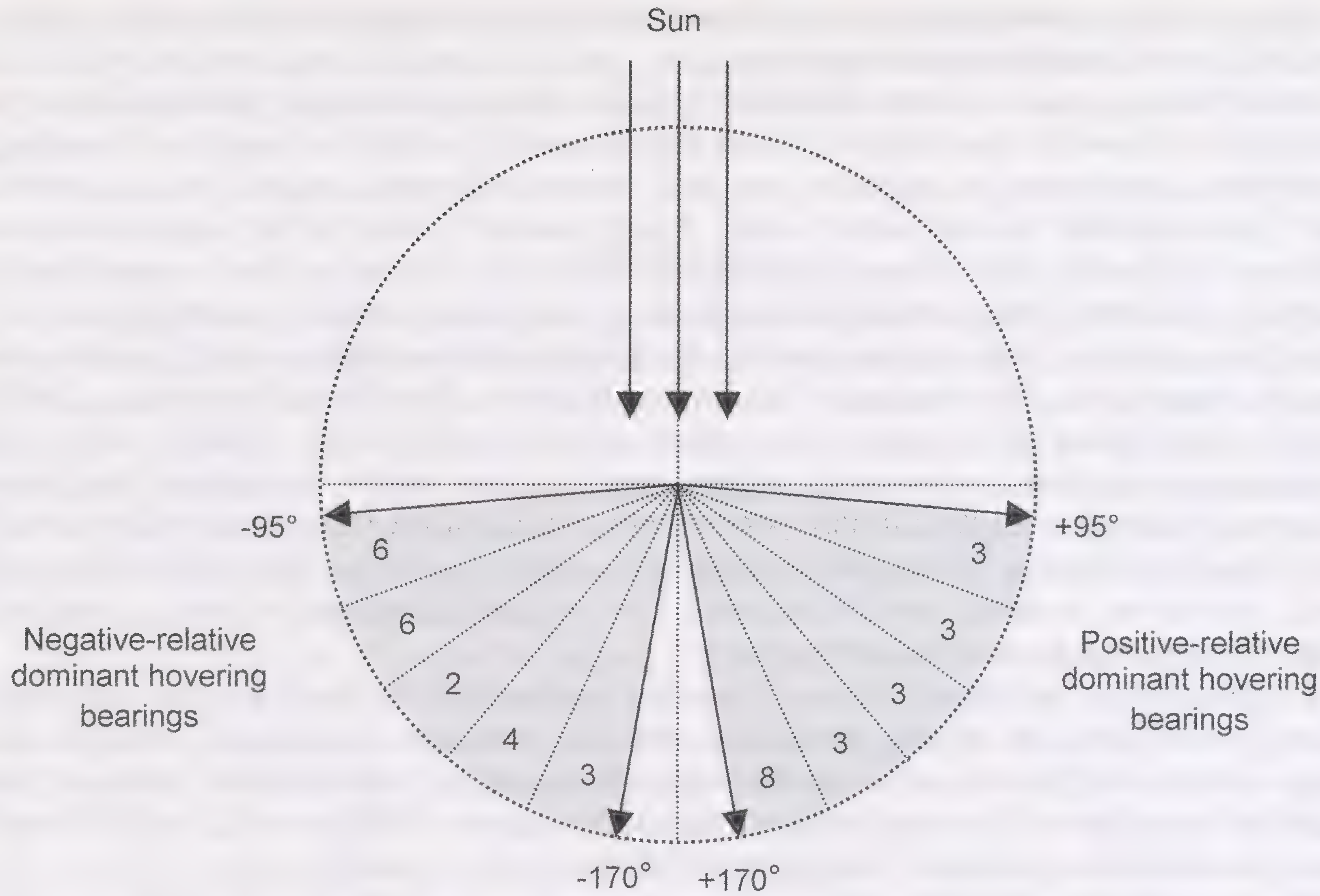

Fig. 1. A graphical representation of the recorded range of dominant swarm bearings of the fly *Fannia armata*, relative to the bearing of the sun (represented by the three vertical lines) from the 35 swarming sites. The grey shading shows the recorded range of the 20 positive- and 21 negative-relative bearings, which have been divided into 15-degree sectors to show the distribution of the observations. Further details of the results can be obtained from the author on request.

alignment match a path's direction. The swarms were also located too far into the wood for the wood edge to be a factor. The wind direction and velocity did, however, have an effect. Due to the density of the wood, the wind was not a factor at any bar one of the swarming sites. At one site, when the wind velocity increased above a certain level, the swarm changed from its dominant relative swarming direction to face directly into the wind, returning to the original bearing when the wind died down. The small changes in direction also ceased when the wind velocity increased. It was assumed that it would be easier for the species to keep station at the swarming site, by facing directly into the wind when the wind velocity increased above a particular level. The actual trigger point could not be determined due to the lack of an anemometer. Wind velocity has also been reported as affecting the swarming behaviour of other Diptera. A weak wind, for example, had no effect on the swarming behaviour of *Smittia extrema* (Holmgren) (Chironomidae), but swarming ceased during moderate and strong winds (Syrjamaki, 1968). Chiang & Stenroos (1963) reported a more extreme example of an *Anarete* species of midge (Cecidomyiidae) that ceased swarming whenever there was even a slight breeze. With the correlation tests suggesting a significant strong relationship between the bearings of the sun and the dominant swarm hovering bearings, it is therefore posited that the dominant hovering direction of *F. armata* swarms is governed by the bearing of the sun from the swarming site. Furthermore, it is posited that the dominant hovering bearings of *F. armata* swarms are not influenced by the surrounding

structure of the wood, but that a swarm's hovering bearing and behaviour can be modified by wind velocity and direction.

Swarming in insects is generally a mating activity in which groups of males (from one to a thousand or more) hold station, usually with reference to a visual marker, and await the arrival of a receptive female (Thornhill, 1976; Sullivan, 1981; Blackwell *et al.*, 1992; Gullan & Cranston, 2005). It is useful to note that there are a few species, such as the empid *Empis borealis* (L.), where the females swarm to attract males (Svensson & Petersson, 1995). With all the recorded *F. armata* swarms consisting entirely of males, it seems reasonable to assume that swarming is also a mating function in this species. Only one female was found at a swarming site and that was unintentionally swept from low vegetation when sampling a low-level swarm. The lack of females is not an unusual situation when studying swarms (Downes, 1969; Gilbert, 1984). From the human perspective, it was far easier to spot *F. armata* swarms when viewing them against the sun, than with the observer between the sun and the swarm. If this is so for female *F. armata*, then to increase the chances of mating, and assuming that females fly towards the swarm, the males should face away from the sun, in the direction in which females are likely to approach. The results revealed that *F. armata* swarms in the study woods did indeed face away from the sun (Fig. 1). The Chi square and Whitney-Mann U tests revealed there was no preference for facing either clockwise or anti-clockwise, relative to the sun. As an element of their swarming behaviour, individuals also scanned either side of the dominant bearing. This behaviour is seen as a method of increasing both the chance of being seen by the females, by varying the light reflected from the insect, and the chance of detecting approaching females.

The majority of swarms were located in glades, but near to the trunks of deciduous trees. The fact that the majority of the recorded marker trees were sycamore was probably due to the large amount of sycamore in the study woods. Although no feeding was observed, the trees were presumably being used as food-related swarm markers, reflecting the noted attractiveness of the sap of broadleaf trees to Fanniidae (Rozkon, Gregor & Pont, 1997).

With swarms starting at approximately 0.5 m above ground level and extending to an upper limit of 3.5 m, *F. armata* was found to be a low-level swarming species. Within Delapre Woods, several other fanniid species were also found to form swarms at low levels. *Fannia lustrator* (Harris) formed swarms from just above ground level up to approximately 1 m, whereas *F. coracina* (Loew) swarms occupied a space from approximately 0.5–2 m above ground level. A small group of six *F. sociella* (Zetterstedt) was also observed swarming at approximately 2m above ground level. Sampling the level above head height revealed yet another swarming fanniid species *F. umbrosa* (Stein) and it is highly likely that more of the British species of Fanniidae also form swarms at higher levels. Within Delapre Woods, several large glades were present in which swarming flies were observed from ground level up to the canopy height of approximately 20m; the swarms being grouped into three to four visible layers, with approximately 3m between the centre of each layer. This suggests that different species may limit themselves to distinct height ranges as a mating strategy, a possible example of the niche concept (Speight, Hunter & Watt, 2008).

Observations ceased when adult *F. armata* disappeared from Delapre Woods. This occurred at the end of July, whilst the literature gives the flight period of *F. armata* lasting from May to October (d'Assis-Fonseca, 1968; Rozkon, Gregor & Pont, 1997). Is this actually the flight period recorded for the species elsewhere within its wide (Eurosiberian) distribution, or is there a second generation? Further investigations into *F. armata* behaviour and ecology should reveal some answers

and with little known about its developmental cycle (Rozkošný, Gregor & Pont, 1997), there are plenty of opportunities to make progress.

Conclusions

This study established that the orientation of *F. armata* swarms is governed by the bearing of the sun from the swarm site, thus rejecting the null hypothesis that *F. armata* swarms are randomly orientated. There is a paucity of information on the orientation of swarms in the literature and hopefully this study will stimulate research of a similar nature. The existence of a long swarming period, details of the swarm height and typical swarm markers add to the knowledge of *F. armata*.

Acknowledgements

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THE IDENTITY OF *STENOPSOCUS* SPECIES (PSOCOPTERA: STENOPSOCIDAE) IN BRITAIN

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ABSTRACT

The study of the standard identification characters of 100 *Stenopsocus immaculatus/lachlani* specimens provided evidence that only one of the two species, *S. immaculatus* (Stephens), occurs in Britain. The measurements of the characters showed that British specimens of this species are considerably more variable than those on mainland Europe. Specimens previously considered as *S. lachlani* Kolbe have been reinvestigated and are now considered to be *S. immaculatus*.

INTRODUCTION

Two of the three European *Stenopsocus* species of barkfly, *S. immaculatus* (Stephens) and *S. stigmaticus* (Imhoff & Labram) have long been recorded in Britain (New, 2005). Separation of these two species is straightforward since *S. stigmaticus* usually has a dark mark along the posterior margin of the pterostigma as well as having vein Cu2 of the fore wing glabrous. The third European species, *S. lachlani* Kolbe, resembles *S. immaculatus* (unmarked pterostigma and Cu2 vein setose) and was not recorded from Britain until 1999 when the author recorded specimens in Scotland (Saville, 2001). The identification proved to be problematic and the specimens needed to be sent to the European Psocoptera authority, Charles Lienhard (Geneva Natural History Museum), for confirmation as *S. lachlani*.

Since then the author has continued to experience considerable difficulty separating *S. immaculatus* (Fig. 1) and *S. lachlani* and undertook a study to determine which of the identification characters are most effective for use with British specimens.

METHODS

New (2005) follows Lienhard (1998) and uses four characters for separating the two *Stenopsocus* species: i) vertex colour and pattern (see Fig. 2), ii) ratio of interocular distance to eye diameter (IO/D) in dorsal view (see Fig. 2), iii) colour of the abdominal apex and iv) tree type association. These characters are summarised in Table 1.

Fig. 1. A female adult *Stenopsocus immaculatus*.

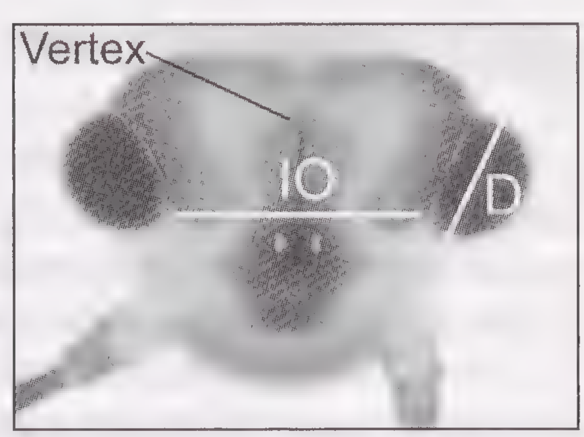

Fig. 2. Vertex of *Stenopsocus* showing interocular distance (IO) and compound eye diameter (D) measurements.

Table 1. Characters used for identification of *Stenopsocus* species according to Lienhard (1998)

ID character	*S. immaculatus*	*S. lachlani*
Vertex	Yellowish or pale brown with at least two very pale longitudinal bands	Almost uniformly dark brown
IO/D ratio – male	0.8–1.0	1.3–1.5
IO/D ratio – female	1.6–1.9	2.0–2.4
Abdominal apex colour	Yellowish	Brown
Tree type	Broadleaved	Coniferous

In the study, the identification characters of 100 specimens (35 males, 65 females) of *S. immaculatus*/*lachlani* that had been collected mainly from Scotland (84 specimens) but also some English (13) and Welsh (3) locations were recorded. All of these were collected by the author with the exception of three collected from England by Keith Alexander. All of the specimens were preserved in 70% alcohol. Since the colouration of psocid specimens often fades following prolonged storage in alcohol only specimens that had been preserved for less than two years were used in the study. The original specimens that were confirmed as *S. lachlani* by Lienhard (Saville, 2001) had faded and were consequently not included in the main study. However, the IO/D ratios of these specimens were measured separately and are included in the results section.

The tree species on which specimens were collected was recorded. Forty-three specimens were from broadleaves while 57 were from conifers/evergreens. Broad-leaved species were: oak spp. (23 specimens), alder (5), hawthorn (3), elder (2), sallow spp. (2), hazel (2), unspecified (2), beech (1), birch spp. (1), honeysuckle (1) and rowan (1). Coniferous/evergreen species were: yew (25), unspecified conifer (12), pine (9), cypress (7), Sitka spruce (2), larch (1) and holly (1). Almost half of the specimens were found on either oaks or yew.

Ten additional specimens (five males, five females) of genuine *S. lachlani* from Finland (kindly provided by Jussi Kanervo) were also measured and photographed to provide a comparison with the British material.

The IO/D ratios were measured using a Leica MZ16 microscope fitted with an eyepiece graticule. In order to standardise the results an identical magnification was used for all specimens. The graticule could be read to 0.5 divisions and the approximate error in the measurements was 2%. The size of the eyes on the same specimen was occasionally different and so the IO/D ratios were measured for each eye separately and then averaged.

Results

The vertex colour of the two species would appear from their identification descriptions to be distinctly different. However, the colour and pattern of the specimens in the study formed a continuum between the two extremes and there was a need to decide which the 'nearest fit' was for many specimens. Confusingly, despite the identification description given in the literature the vertex of specimens ranged from pale to dark brown irrespective of the presence of light bands (e.g. see Figs. 3a and 3b). When assigning specimens the presence of light bands was given precedence over the vertex colour. The following photographs (Figs. 3a–f) show which forms of facial pattern have been assigned to each character. Female specimens 3a–b and male specimens 3d–e were considered as having light bands on the vertex. Female

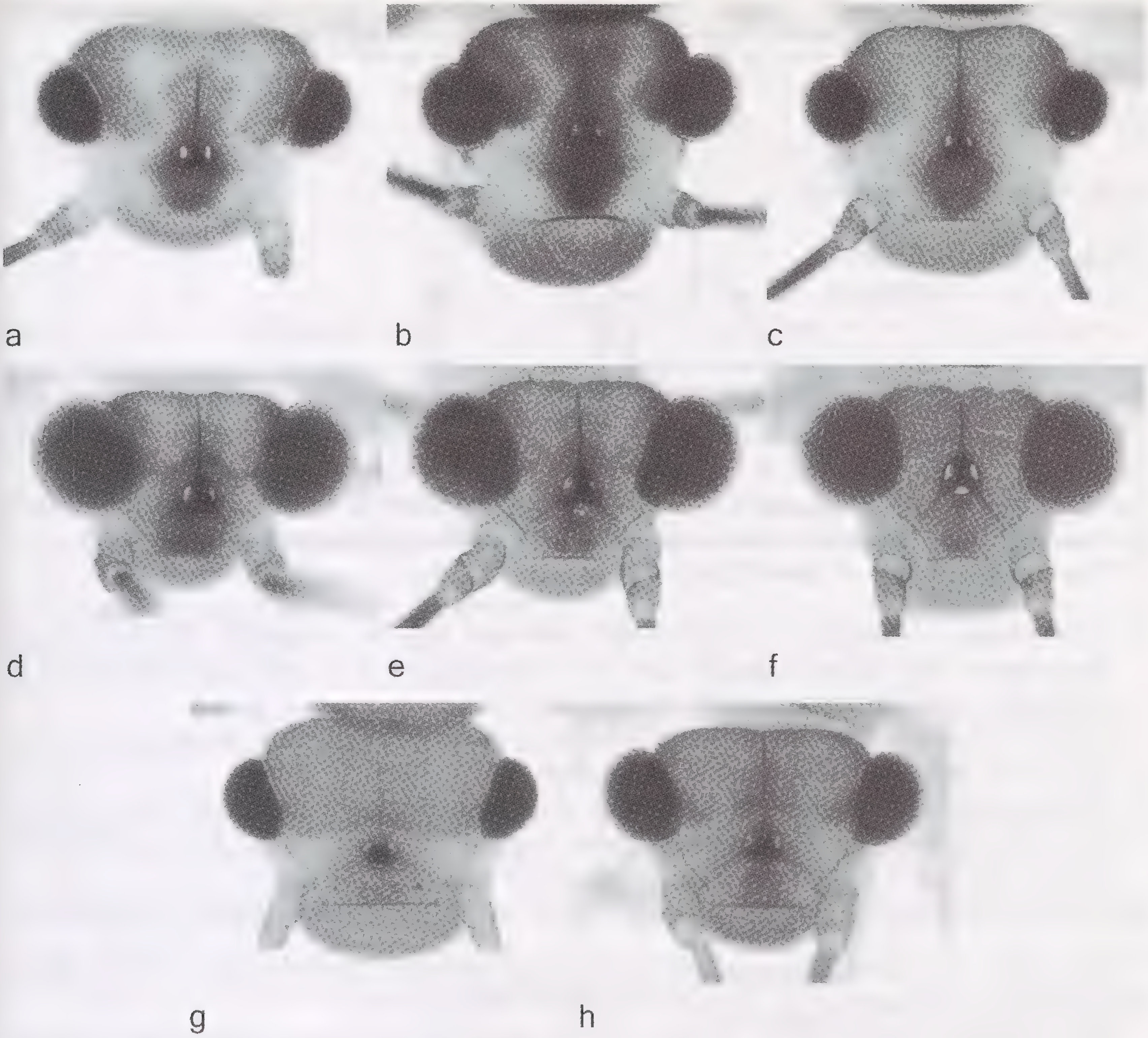

Fig. 3a–h. Variations in vertex pattern and eye dimensions of *Stenopsocus immaculatus*. a–c, British females. d–f, British males. g–h, Finnish *Stenopsocus lachlani* (female and male).

specimen 3c and male specimen 3f were considered as having a 'dark' vertex. The colour and pattern of males and females were somewhat different (e.g. the light bands on males were never as marked as in some females). Photographs of female and male specimens of *Stenopsocus lachlani* from Finland are included (3g–h) as a comparison with the British material.

The colour of the abdominal apex of all the specimens was brown/grey-brown ranging from moderately dark to virtually colourless. No specimens exhibited the yellowish colour described by Lienhard as a characteristic feature of *S. immaculatus*. This could be explained by assuming that *S. immaculatus* does not occur in Britain but since many specimens had other characters of *S. immaculatus* this explanation was considered unlikely. It seems that in Britain at least this character is not suitable for separating the two species and has not been included in the analysis.

The numbers of specimens having the different combinations of the three other characters are summarised in Fig. 4 and Table 2. In Fig. 4 each symbol (triangle or circle) indicates the characteristics of a single *Stenopsocus* specimen. The triangle and circle symbols represent specimens from coniferous and broadleaved trees, respectively. On the chart, specimens found on conifers are shown to the left of

Table 2. Numbers of *Stenopsocus* specimens with different combinations of characters

		IO/D ratio – male			IO/D ratio – female		
Vertex colour	Tree type	0.8–1.0	1.01–1.29	1.3–1.5	1.6–1.9	1.91–1.99	2.0–2.4
Light bands	Broadleaved	**10**	3	0	**7**	10	4
	Coniferous	4	1	0	12	9	6
'Dark'	Broadleaved	6	1	0	1	1	0
	Coniferous	9	1	**0**	9	4	**2**

the vertex lines, broadleaves to the right. Data from all the study specimens are included in the chart but because some specimens have identical characters the number of symbols shown is less than 100. The long shaded rectangles indicate the expected ranges for male and female *S. immaculatus* and *S. lachlani* specimens based on the three identification characters mentioned in the literature (see Table 1).

The results in Fig. 4 show that:

1) The range of ratios of inter-ocular distance to eye diameter (IO/D) of all specimens was closely similar for both males (0.8–1.1) and females (1.6–2.1) irrespective of the vertex type or tree type.
2) The IO/D ratios fitted more closely to the expected range of *S. immaculatus* with only two specimens falling into the range of *S. lachlani.*
3) The ranges in IO/D ratio were greater than expected for both sexes i.e. the range for females was 1.6–2.1 compared to an expected range of 1.6–1.9; for males, the range was 0.8–1.1 compared to an expected 0.8–1.0.
4) The tree preference of females with a dark vertex was predominantly coniferous.

The total numbers of specimens having the different combinations of the three identification characters are summarised in Table 2.

The numbers in bold in the table represent the number of specimens that exhibited all three expected characters of a particular species. These figures indicated that there were 10 male and 7 female 'typical' *S. immaculatus* and 0 male and 2 female 'typical' *S. lachlani.* In total, these comprised 19% of the 100 specimens in the study (29% of the 35 males, 14% of the 65 females).

Only two specimens displayed all the characteristics of *S. lachlani.* One of these with an IO/D ratio of 2.02 was collected with four others from the same tree on the same day and this additional data helps put the significance of the '*S. lachlani*' specimen into perspective. The five specimens were collected from a yew tree at Vogrie Country Park, Midlothian, Scotland on 7.ix.2006. Three of the specimens also had a 'dark' vertex but the two females had an IO/D ratio of less than 2.0 while the male had an IO/D ratio of less than 1.0. The other specimen had light bands on the vertex. These results indicate that there was significant variability between specimens in the local population with the one '*S. lachlani*' specimen representing one end of a continuum.

Specimens collected by the author in the Lothians, Scotland and determined by Charles Lienhard as *S. lachlani* were not included in the main study because the vertex colour of the specimens had faded. Two of the four specimens fell within the range of *S. lachlani* but, as in the case of the two specimens in the main study only by a small amount (IO/D ratios of 2.00 and 2.03).

Because so few of the British specimens appeared to have the characteristics of *S. lachlani* it was considered valuable to take measurements of genuine *S. lachlani*

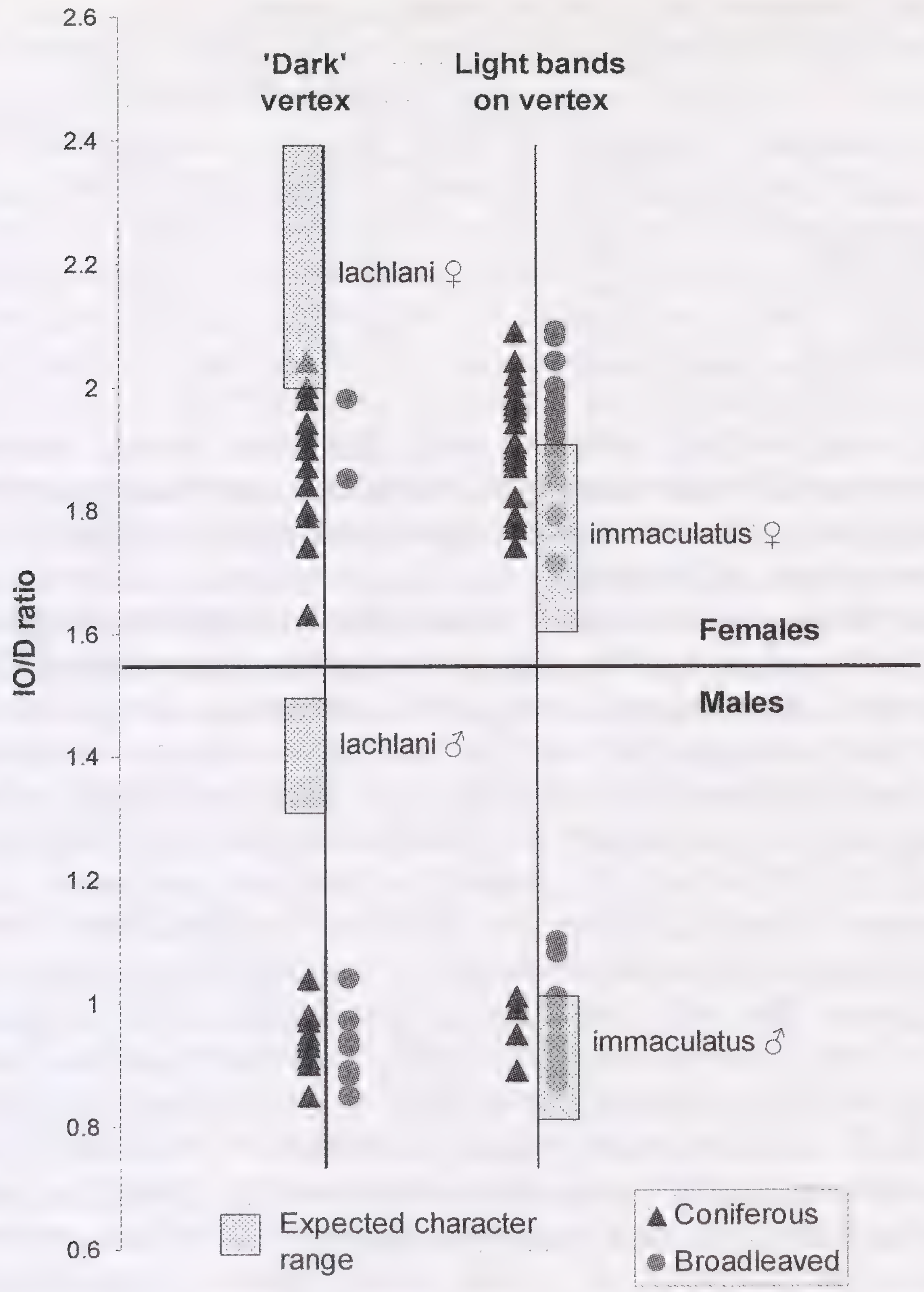

Fig. 4. Identification characters of British *Stenopsocus* specimens

specimens from Europe to provide comparative data. Of the ten specimens (5 male, 5 female) from Finland none had light bands on the vertex expected of *S. lachlani* although the colour of the vertex was pale brown (see Figs. 3g–h). The IO/D ratio of the males ranged from 1.44 to 1.62 and of the females 2.12 to 2.20, respectively. The small eye size of the males in particular was strikingly different from the British male specimens.

Discussion

In order to be able to distinguish specimens of *S. immaculatus* from *S. lachlani* in Britain it is necessary to determine which of the four identification characters (see Table 1) are effective and reliable. As mentioned in the methods section, the abdominal apex colour was not considered an effective character and was not included in the detailed analysis.

If the three remaining characters are all effective then all of the specimens shown in Fig. 3 should fall within the four shaded areas. This is not the case, with only 19% of the specimens having all three expected characters. This observation goes a good way to explaining why so much difficulty has been experienced identifying the species; one or more of the characters are not effective for British material.

Table 3. Percentage of specimens with both expected characters

	'Correct' characters (%)			
	S. immaculatus		*S. lachlani*	
Character pair	Male	Female	Male	Female
IO/D ratio – vertex type	40	29	0	3
IO/D ratio – tree type	46	12	0	12
Vertex type – tree type	37	32	29	23

The next step was to check whether two characters alone were effective for identification purposes. The percentage of specimens showing the correct combination of two characters for the two species, based on the total sample of 35 males and 65 females is summarised in Table 3.

In theory a pair of characters is likely to be effective for identification purposes if the percentage value is close to 100. If a species is not present, then the percentage should be 0. None of the pairs achieved 100% indicating that at least one of the characters of the pair was not effective. The zero percentages of specimens with the expected characters of males of *S. lachlani* for two of the pairs both included the IO/D ratio character. This suggests that the IO/D ratio may be an effective character and that males of *S. lachlani* are not present in the study specimens.

A striking feature of the results (see Fig. 4) is that the IO/D ratio ranges for both males and females form tight clusters that are to a great extent independent of the vertex and tree types. The only exception is that females with a 'dark' vertex are much more likely to be found on conifers. Is this observation due to *S. lachlani* being present or is it due to environmental factors (e.g. available food) modifying the form of the species? If *S. lachlani* were present it would be expected that all of the specimens in a local area would have a dark vertex but the data from Vogrie Country Park show that the population on a single tree can have both light and dark vertexes. This suggests that the presence of a dark vertex does not have to indicate the presence of *S. lachlani* and shows that although the vertex and tree type characters are apparently successful at separating *S. immaculatus* and *S. lachlani* on the Continent they do not work with British material.

The question then is whether the IO/D ratio, on its own, is an effective identification character? The IO/D ratio ranges form tight groups for each sex. These ranges are close to the expected ranges of *S. immaculatus* and only slightly overlap (in the case of females) with the ranges of *S. lachlani*. This suggests that: i) IO/D ratio is an effective identification character for British material and that ii) only one species is present in the study sample. Although the IO/D ratio ranges of the specimens extends beyond the expected ranges the closest fit for the species present is *S. immaculatus*.

Although no specimens of *S. lachlani* were found in the study there is still the possibility that the species occurs in Britain or may be introduced with imported conifers in the future. The IO/D ratio range is the only character that can be used to determine its presence in Britain. Based on the results shown in Fig. 3 suitable ranges for *S. immaculatus* are: females – 1.6–2.1 and males – 0.8–1.1; ranges for *S. lachlani* are: females – 2.2–2.4 and males – 1.3–1.5.

Conclusions

Of the four identification characters used by Lienhard to separate *S. immaculatus* and *S. lachlani*, the abdominal apex colour was found to be ineffective for British

material and was excluded from the main analysis. The results for the other three identification characters indicate that neither the combined three characters nor any of the three pairs of characters were effective in separating *S. immaculatus* and *S. lachlani* in the study specimens. The range of variability between specimens in local populations (as illustrated by the '*S. lachlani*' specimen from Vogrie Country Park) further reduces the value of the characters for separating the two species. Although the specimens are mainly from Scotland it is likely that this reflects a general problem using the three identification characters on British specimens.

The evidence suggests that the IO/D ratio range, although apparently more variable than has been found on the Continent, is suitable for separating the two species and the results show that only *S. immaculatus* was present in the study sample. Although Lienhard confirmed specimens collected in Scotland as *S. lachlani* this was based on vertex type and the Continental IO/D ratio range. This study has shown these to be inappropriate for British material. So, current evidence suggests that *S. lachlani* has not yet been recorded in Britain. The present study also raises the question of how *S. lachlani* can be recognised and it is recommended that specific IO/D ratio ranges are used. There is still the possibility that *S. lachlani* occurs in Britain but has not yet been found due to under-recording. However searches of Caledonian pine forest, one of the potentially most suitable habitats, by the author at Rothiemurchus and the Black Wood of Rannoch in 2008 failed to turn up any *Stenopsocus* specimens of any species.

There is also the question of why *S. immaculatus* is so much more variable in Britain than on the Continent. It would be helpful, in the first instance, to find out whether this variability is specific to Britain or whether similar studies in other European countries show comparable trends. This additional information is likely to be required before a satisfactory explanation can be formulated.

Lienhard has pointed out that *S. immaculatus* and *S. lachlani* are not always easy to distinguish and there is a need to study the reproductive isolation of the two species (Lienhard, 1998). It would be particularly informative to extend this and carry out breeding studies between British material and each of the two species using Continental material.

This study was started because of the difficulty in assigning a name to *Stenopsocus* specimens in Britain. The results suggest that only *S. immaculatus* is likely to be present and as it stands it is advisable to regard all British records of *S. lachlani* as *S. immaculatus*.

Acknowledgements

The author would like to thank the Entomology Section, National Museums of Scotland, Edinburgh for providing facilities for measuring and photographing specimens. I would also like to thank Keith Bland, John Hollier, Charles Lienhard, Richard M. Lyszkowski and Alastair Sommerville for their useful comments on the draft manuscript. Thanks also go to Jussi Kanervo and Keith Alexander for providing specimens for the study and to Alby Oakshott for providing the photograph of *S.immaculatus*.

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SHORT COMMUNICATION

Why do moths drown in ponds? – Over the past 40+ years, the second author has never missed an opportunity to fish out drowned and drowning moths from the ponds and pools of Southern England. It is clear that the numbers of moths trapped cannot all arrive there by chance, and that positive attraction must be involved.

Winter flying species such as Winter moths *Operophthera* spp., Mottled Umber *Erannis defoliaria* (Clerck), Dotted Border *Agriopis marginaria* (Fabr.) (Geometridae) are often active in cold weather when aquatic predators such as notonectids are inactive, so they can remain (often alive) on the surface film for at least a day.

An extreme example of this behaviour occurred on the night of the 6–7 December 2008, which was the coldest night of the 2008–09 winter to that date, with a widespread ground frost, with many surfaces frozen from 18.30 h onwards. The distribution of winter moth males on the ponds at Sparr Rough, West Sussex, on that night was typical of that recorded over the past decade or so. A small pond (A) of 5 m × 2 m on the southern edge of the wood invariably attracts the most moths, with a record of 63 Winter moths and one Mottled Umber, on the 6.xii. All except three were intact and many that were fished out were still alive. Only eleven moths were found on a much larger water body some 40 m to the west, and only three were found on two small ponds on the northern edge of the wood. The night of the 6.xii. had been clear, and a bright half moon had shone from dusk onwards. The inference is that the moon is regularly reflected in pond A, whereas the other small ponds are blocked by a building/trees, so that the moon is never reflected. The moon may be partly reflected in the largest pool when at its zenith, albeit through bare trees.

No moths were present on a small pond at the northern edge of the wood which had developed a thick layer of ice, so it is unlikely that moths were landing on the surfaces at random. Although in previous winters we have seen moths trapped on very thin clear films of ice, which may have developed after the moths became trapped on the cooling water.

Our hypothesis is therefore similar to the frontrunner of the putative theories for the age old enigma of why moths come to light, namely that they somehow use the moon for navigation (Majerus, 2002, *Moths*, Collins New Naturalist), and as it is so far away is fixed with respect to a moving moth, whereas a light (such as a moth trap) being so much nearer changes position with respect to the moving moth. Thus the moth tries to keep the light in a fixed position and is therefore drawn toward it spiral fashion as it continually corrects its flightpath in an attempt to keep the point source in the same orientation.

In the case of the ponds, the moths are flying around within the copse, perhaps using the moon as a navigation aid, but the reflected moon behaves like a moth trap light, as it is confined within the reflective surface of the pond, drawing the moths downward to their doom.

This does not explain why some moths are found on the shaded ponds, however these still reflect a brighter moonlit sky, which may provide an (albeit lesser) stimulus to passing moths. Obviously on moonless nights differences in attractiveness of the various water bodies will still be evident as a result of differences in the amount of sky being reflected. The problem is that on cloudy nights when these differences will be slight, correspond to warmer temperatures, and active predators removing the evidence. – JONTY DENTON, Old Hall Place, Hussell Lane, Medstead, Hants, GU34 5PF, & DON TAGG, 7 Santina Close, Upper Hale, Farnham, Surrey, GU33

CONFIRMATION OF THE PRESENCE OF SMALL SPRUCE BUD SCALE, *PHYSOKERMES HEMICRYPHUS* (HEMIPTERA: COCCOIDEA: COCCIDAE), IN BRITAIN

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ABSTRACT

The presence of *Physokermes hemicryphus* (Dalman) in Britain has been confirmed for the first time. A large population of *P. hemicryphus* was found in Stamford Bridge, East Yorkshire, during 2006–2008 damaging a Norway spruce (*Picea abies*). Two hundred and eight post-reproductive adults were collected in October and November 2007; 92% were found to have parasitoid exit holes (up to 13 holes per scale). Three hymenopterous parasitoids and one beetle were reared from the scales: *Aphycoides clavellatus* (Dalman) (Encyrtidae); *Aprostocetus ?trjapitzini* (Kostjukov) (Eulophidae); *Microterys lunatus* (Dalman) (Encyrtidae) and an *Anthribus* sp. (Anthribidae). A small number of first instar *P. hemicryphus* were observed in May 2008, almost two months earlier than usually recorded. Examination of specimens deposited at the Natural History Museum, London, and the Central Science Laboratory revealed that *P. hemicryphus* occurs widely in England and has been misidentified in the past as *P. piceae* Schrank. The status of *P. piceae* in Britain is uncertain as no valid specimens were found. *Pseudotsuga menziesii* (Mirb.) Franco is recorded as a new host plant for *P. hemicryphus*. The host range, biology, geographical distribution and economic importance of *P. hemicryphus* are reviewed.

INTRODUCTION

The genus *Physokermes* (Hemiptera: Coccoidea: Coccidae) contains 11 or 12 Holarctic species that feed on Pinaceae (Ben-Dov, 1993; Kosztarab, 1996; Ben-Dov, Miller & Gibson, 2007). The adult females are remarkably cryptic, as they are globular and closely resemble plant buds, and usually form under the bud scales (Figs 1–2). They are morphologically unique among the Coccidae as the adult females do not possess anal plates (Hodgson, 1994). Identification of *Physokermes* species is problematical as in most cases only the teneral adult females can be specifically identified; once they become reproductively mature, they are swollen and heavily sclerotised and no reliable taxonomic characters can be distinguished (Hodgson, 1994). The teneral period is very brief and it is the post-reproductive adults that are most frequently collected. This has resulted in taxonomic confusion between some of the species, for example, *P. hemicryphus* (Dalman) has frequently been misidentified as *P. piceae* Schrank in Europe (Kosztarab & Kozár, 1988; Kosztarab, 1996) and in North America (Gill, 1988; Furniss, 2004).

Three species of *Physokermes* occur in Europe; *P. hemicryphus* and *P. piceae* are widespread, whereas *P. inopinotus* Danzig & Kozár is restricted to Hungary (Kosztarab & Kozár, 1988). Prior to this publication, *P. piceae* was the only species of *Physokermes* recorded from Britain (Boratynski & Williams, 1964).

Physokermes was first collected in Britain by Robert Newstead in Delamere Forest, Cheshire, on Norway spruce, *Picea abies* L. Karst. (= *P. excelsa* Lk.), in July 1891 (Newstead, 1893). Newstead (1893, 1901, 1903) recorded the species under the name *P. abietis* (Geoffroy) and listed several synonyms, including *Coccus piceae* Schrank (= *P. piceae*) and *Coccus hemicryphus* Dalman (= *P. hemicryphus*). Green

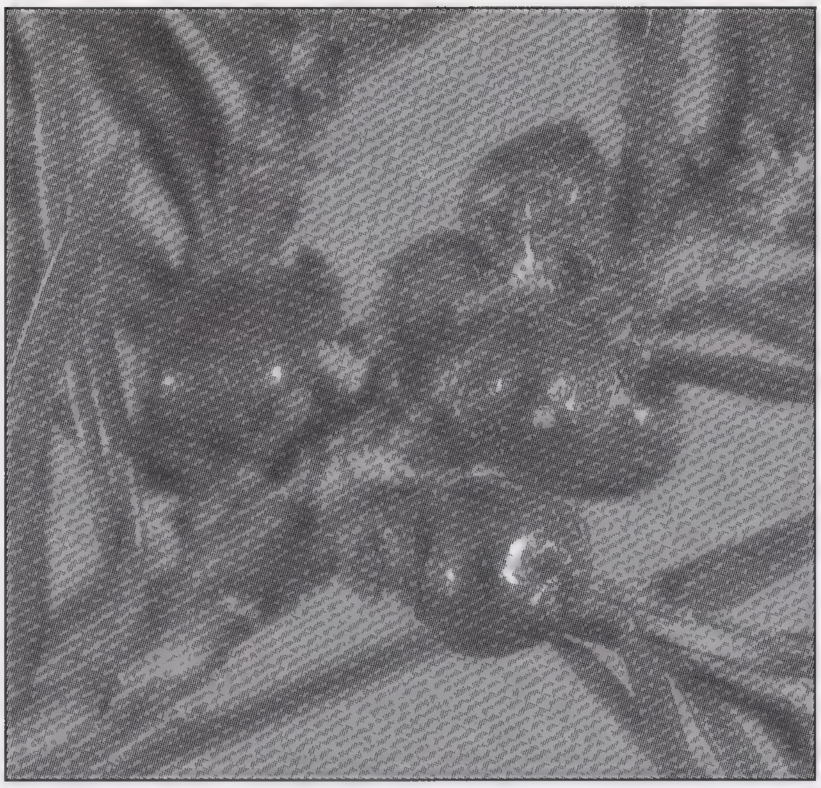

Fig. 1 A group of post-reproductive adult female *Physokermes hemicryphus*.

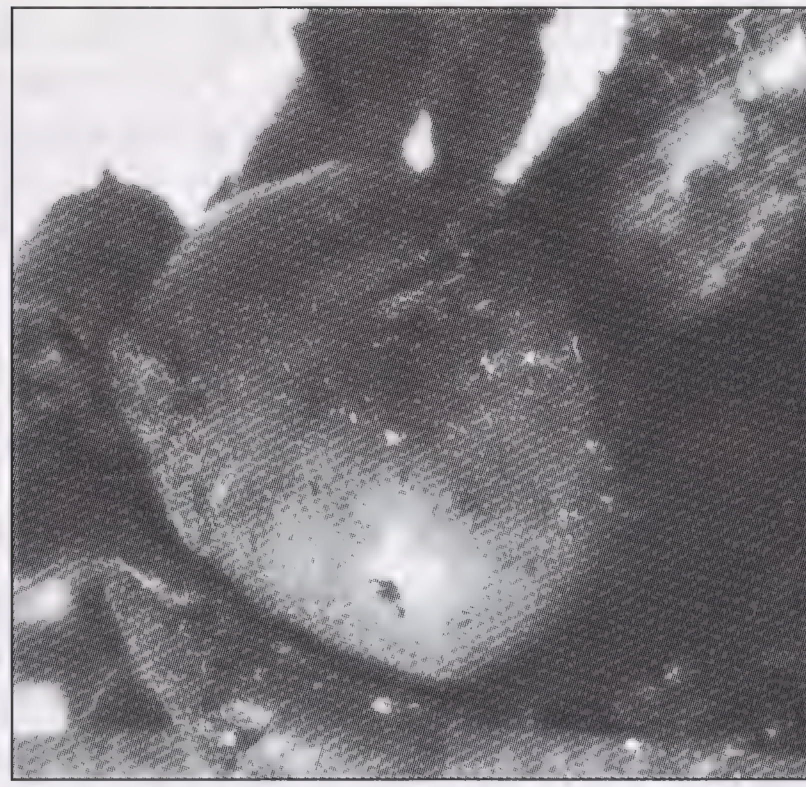

Fig. 2 Close-up of the posterior of an adult female *Physokermes hemicryphus*.

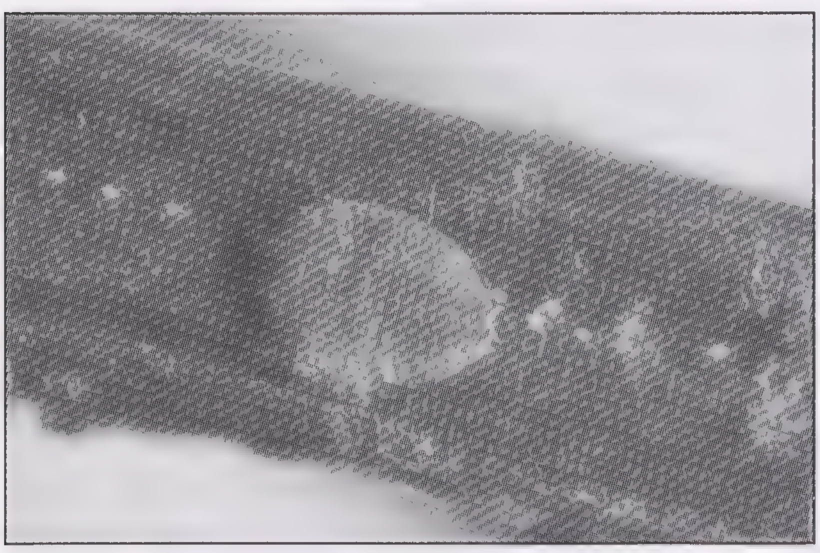

Fig. 3 First-instar *Physokermes hemicryphus* feeding at the base of a needle.

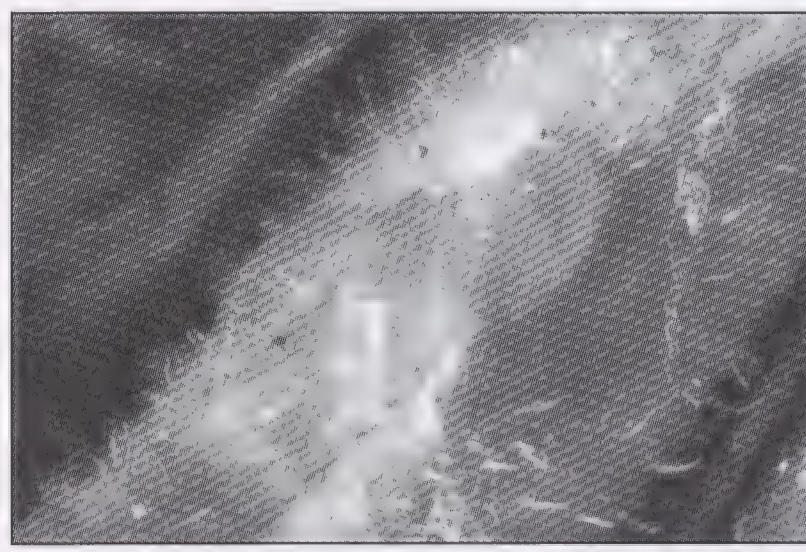

Fig. 4. Second-instar *Physokermes hemicryphus* overwintering beneath a bud scale.

(1917) subsequently found '*P. abietis*' to be common in Camberley, Surrey. Boratynski & Williams (1964) listed *P. piceae* in their checklist of British Coccoidea. Subsequently, the name *piceae* has been used for all *Physokermes* found in Britain (Bevan, 1987; collections at the Natural History Museum (NHM), London, and the Central Science Laboratory (CSL)). There has been confusion over the identity of *P. abietis* with Boratynski & Williams (1964) and Ben-Dov (1993) treating it as a junior synonym of *P. piceae*, whereas other authors have treated it as a junior synonym of *P. hemicryphus* (Kosztarab & Kozár, 1988; Kozár, 1998). The International Committee on Zoological Nomenclature Opinion 228 (1954), however, ruled that binomens published by Geoffroy (1762) are not available for nomenclatorial purposes and recent workers have not recognised *P. abietis* (Ben-Dov, 1993; Hodgson, 1994; Ben-Dov, Miller & Gibson, 2007).

Schmutterer (1956) found that the second instars of *P. hemicryphus* and *P. piceae* could be easily separated morphologically. The present author collected 80 + second-instars from a *P. abies* tree in Stamford Bridge, East Yorkshire (collection details given below), and found them all clearly to be *P. hemicryphus*. He then examined all *Physokermes* microscope slide preparations (43 slides labelled *P. piceae*) collected in Britain deposited at the NHM, and 4 slide preparations from the CSL, and identified

them all as *P. hemicryphus*, not *P. piceae*, with the exception of one slide that was identified as suspect *P. hemicryphus*.

The purpose of this communication is to confirm the presence of *P. hemicryphus* in Britain, to record its biology in England and to report it damaging an ornamental spruce tree.

Identification

In life the post-reproductive females are bud-like, shiny, red-brown to dark brown, up to 4.5 mm long and 4 mm wide (Figs 1–2) (*P. piceae* are usually larger, growing up to 8 mm in length). Teneral adult female *P. hemicryphus* have recently been illustrated and described by Gill (1988, with a key to Californian species), Hodgson (1994), Kosztarab (1996, with a key to north-eastern USA species), Kosztarab & Kozár (1988, with a key to central European species), Schmutterer (1956), Tang (1991, with a key to Chinese species) and Tereznikova (1981). Schmutterer (1956) described the first and second instars. Second-instar *P. hemicryphus* possess 0–15 thick-rimmed 6-locular pores, whereas second-instar *P. piceae* possess more than 70 pores.

Geographical distribution

Physokermes hemicryphus is native to Europe, central and north Asia and has been accidentally introduced to North America. Within the Palaearctic it has been recorded in Austria (Kosztarab & Kozár, 1988), Bulgaria (Kozár *et al.*, 1979), Czech Republic (Danzig, 2007), France (Danzig, 2007), Germany (Hodgson, 1994), Greece (Argyriou, 1983), Hungary (Kozár *et al.*, 1977), Italy (Marotta, 1987), Lithuania (Malumphy *et al.*, 2008), Moldova (Kozár & Ostafichuk, 1987), Mongolia (Ben-Dov, 1993), Poland (Zak-Ogaza & Koteja, 1964), Romania (Kozár, 1985), Russia (including Kalinigrad) (Hodgson, 1994), Serbia and Montenegro (Danzig, 2007), Slovakia (Danzig, 2007), Slovenia (Danzig, 2007), Spain (Soria *et al.*, 1998), Sweden (Gertsson, 2000), Switzerland (Kozár *et al.*, 1994), the Netherlands (Jansen, 2001), United Kingdom (in this paper) and the Ukraine (Danzig, 2007). In the Nearctic it is recorded from Canada (Kozár *et al.*, 1989) and the USA (Gill, 1988). In California it is restricted to urban areas (Gill, 1988). Further references are provided by Ben-Dov (1993) and Ben-Dov, Miller & Gibson (2007).

Host plants

Physokermes hemicryphus feeds exclusively on *Abies, Picea* and *Pseudotsuga* (Pinaceae) and is most commonly recorded on *P. abies*. Douglas fir, *Pseudotsuga menziesii* (Mirb.) Franco, is recorded here as a new host plant genus and species (collection details are given below). The only other *Physokermes* recorded on *Pseudotsuga* is the Nearctic *P. taxifoliae* Coleman. Only recent references are given for the host plants of *P. hemicryphus* below as earlier references may have confused *P. hemicryphus* with *P. piceae*. Ben-Dov (1993) and Ben-Dov, Miller & Gibson (2007) provide many more references.

Abies alba Mill. (= *Abies pectinata* De Colle) (Kosztarab & Kozár, 1988); *A. borissi-regis* Mattf. (Santas, 1988); *A. cephalonica* Loudon (Santas, 1988); *Abies* sp. (Kosztarab, 1996); *Picea abies* (L.) H. Karst. (Hodgson, 1994); *P. engelmanni* Parry ex Engelm. (Kozár *et al.*, 1989); *P. glauca* (Moench) Voss (Kozár *et al.*, 1989); *P. obovata* Ledeb. (Danzig, 1972); *P. orientalis* (L.) Link (Kozár *et al.*, 1994);

P. pungens Engelm. (Gill, 1988); *P. sitchensis* (Bong.) Carr. (Gill, 1988); *Picea* sp. (Kosztarab, 1996); and *Pseudotsuga menziesii* (reported here).

Biology and natural enemies

Physokermes hemicryphus is parthenogenetic, univoltine and overwinters as the second instar (Schmutterer, 1956; Kosztarab & Kozár, 1988; Santas, 1988; Stimmel, 1996). In southern Germany, adult females develop by late May and each lays up to 335 eggs between early June and early July; egg hatch occurs in 5–6 weeks, from late July to the first half of August; most first instars moult during the second half of September (Schmutterer, 1956). In the USA, the number of eggs recorded for each female varies from 290 to 858 (Furniss, 2004).

Natural enemies include the following:

COLEOPTERA

Anthribidae: *Anthribus nebulosus* Forster (Schmutterer, 1972).

Coccinellidae: *Brumus quadripustulatus* (L.) (=*Exochmus quadripustulatus* L.) (Schmutterer, 1972) and *Scymnus abietis* Paykull (Schmutterer, 1972).

HYMENOPTERA

Aphelinidae: *Coccophagus insidiator* (Dalman) (Schmutterer, 1972).

Encyrtidae: *Aphycoides clavellatus* (Dalman) (= A. *merceti* Ferrière) (Schmutterer, 1955); *Aphycoides tenuis* (Ratzeburg) (Noyes, 2008); *Cheiloneurus claviger* Thomson (Noyes, 2008); *Cheiloneurus paralia* (Walker) (Noyes, 2008); *Metaphycus* sp. (=*Euaphycus* sp.) (Kosztarab & Kozár, 1988); *Metaphycus unicolor* Hoffer (=*M. picearum* Erdös) (Kosztarab & Kozár, 1988); *Microterys cyanocephalus* (Dalman) (Noyes, 2008); *Microterys fuscipennis* (Dalman) (Kosztarab & Kozár, 1988); *Microterys lunatus* (Dalman) (Schmutterer, 1972); *Microterys tessellatus* (Dalman) (=*M. obscuricornis* (Mercet)) (Schmutterer, 1955); *Pseudorhopus testaceus* (Ratzeburg) (Schmutterer, 1955); and *Tetracnemoidea piceae* (Erdös) (Noyes, 2008).

Eulophidae: *Aprostocetus trjapitzini* (Kostjukov) (Noyes, 2008) and *Baryscapus sugonjaevi* (Kostjukov) (Noyes, 2008).

Pteromalidae: *Pachyneuron muscarum* (L.) (Noyes, 2008).

All the natural enemies listed above are present in the UK except for *A. tenuis, B. sugonjaevi, M. cyanocephalus, M. fuscipennis, M. unicolor*, *S. abietis* and *T. piceae*. *Pseudorhopus testaceus* is an effective parasitoid in Europe (Voinovich & Sugonyaev 1993) and *A. nebulosus* an effective predator in the USA (Kosztarab, 1996).

Observations on *Physokermes hemicryphus* in Britain

Slide-mounted material examined:

All slide-mounted specimens from the NHM and the CSL collections (prior to 2007) were labelled *P. piceae*. In addition to the specimens listed below, there was also a single slide with two post-reproductive adult females collected from Berkshire, Windsor Forest, on *P. abies*, 24.iii.1933 (*H. Donisthorpe*) (NHM). These specimens are suspected to be *P. hemicryphus* based on body size and length of the appendages.

Bedfordshire: Luton, Wardown Park, on *P. abies*, 23.xi.1992 (*C. Malumphy*) (CSL, 3 slides with second instars and adult females).

Berkshire: Silwood Park, on *P. abies*, 27.v.1948, 15.viii.1948, 9.ix.1948, 1.ii.1949 (*K. Boratynski*) (NHM, 21 slides with first and second instars and teneral adult females).

Cheshire: Delamere Forest, on *P. abies*, 1891, 10.v.1900, 3.vi.1896 (*R. Newstead*) (NHM, 4 slides with second instars and post-reproductive adult females).

East Yorkshire: Stamford Bridge, Church Road, on *P. abies*, 2006, 11.i.2007, 31.i.2007, 19.vii.2007, 18.x.2007, 2.xi.2007, 19.v.2008 (*C. Malumphy*) (CSL, 18 slides with first and second instars and adult females).

Hereford and Worcestershire: Dymock Forest, on *P. abies*, 22.vi.1977 (NHM, 2 slides with teneral adult females).

Kent: Wye, on *P. abies*, x, no year given (*J. V. Theobald*) (NHM, 1 slide with second instars).

North Yorkshire: Dunnington, Hagg Wood, on *P. abies*, 20.vi.2008 (*C. Malumphy*) (CSL, 1 slide with a teneral adult female).

Surrey: Camberley, on *P. abies*, 22.vi.1919, 13.v.1919, 6.vi.1919, 10.vi.1919, 6.vi.1920, 6.vii.1920, on *P. menziesii*, 4.vi.1931 (*E. E. Green*) (NHM, 10 slides with first and second instars and teneral adult females); Epsom, on *P. abies*, vi.1965 (*E. Milne-Redhead*) (NHM, 4 slides with teneral and post-reproductive adult females).

During July 2007, the first instars of *P. hemicryphus* were observed actively crawling over the foliage of Norway spruce at Stamford Bridge, while others had settled to feed on the needle bases. By October 2007 the first instars had moulted and the gregarious second instars were found crowded beneath the youngest bud scales with a few individuals still attached to the needle bases, large numbers of dead first instars were also observed. They overwintered as second (final) instars attached to the needles or beneath bud scales at the branch node from which the current-year's terminal emanated. No male nymphs were found, confirming that the species is pathenogenetic.

In May 2008, the majority of the scales were teneral adult females, most were covered in sticky honeydew that they had excreted themselves. Some of the teneral adults had circular emergence holes cut into their cuticle by adult hymenopterous parasitoids; an adult *Microterys lunatus* (Dalman) was observed, apparently feeding on the honeydew and ovipositing in the scales. On 19 May 2008, four live first instars of *P. hemicryphus* were observed on a small sample of *P. abies* collected from Stamford Bridge. The main egg hatch, however, was observed in July 2008.

The following hymenopterous parasiotoids emerged from the *P. hemicryphus* scales in July 2007: *Aphycoides clavellatus* (Dalman) (Encyrtidae), *Aprostocetus ?trjapitzini* (Kostjukov) (Eulophidae) and *M. lunatus* (Encyrtidae). A single beetle larva of *Anthribus* spp. (in addition to an adult and larval remains of hymenopterous parasitoids), was found inside a dead adult scale in October. During October and November 2007, 208 dead adult scales were collected from a single heavily infested tree. The majority of specimens were from the last two year's growth. Of these, 192 adults had circular parasitoid exit holes, indicating a level of parasitism of 92%. Up to 13 exit holes were found in each adult scale.

The heavily infested spruce tree at Stamford Bridge exhibited considerable needle loss and dieback of the lower branches. The length of the needles during 2007 on the heavily infested branches was about half to two thirds the normal growth. Up to seven adult *P. hemicryphus* were found under the scales of a single bud; up to 16 adults were found around each node.

The tree also had heavy infestations of conifer lachnids (*Cinara* spp.), green spruce aphid (*Elatobium abietinum* (Walker)) and pineapple galls (*Adelges* spp.). The grain

thrips, *Limothrips cerealium* (Haliday), was frequently found overwintering beneath the bud scales together with the second instar *P. hemicryphus*.

Economic importance

Physokermes hemicryphus feeds on phloem sap which weakens the host plant and can cause leaf loss and slow dieback, as has been apparent on the heavily infested tree in Stamford Bridge. It is often a pest in continental Europe, especially on physiologically weakened ornamental trees (Kosztarab & Kozár, 1988). Secondary lateral branches of infested Norway spruce become pendent as a result of growing abnormally in length relative to diameter (Furniss, 2004). Lower branches can be killed, giving the tree an unhealthy appearance (Gill, 1988). In addition, it excretes large quantities of sugar-rich plant sap as 'honeydew'; this encourages the growth of black sooty mould, detracting from the aesthetic appeal of ornamental plants, reducing their area of photosynthesis and promoting leaf drop. The honeydew, however, may be beneficial by serving as a source of food for bees (Schmutterer, 1972; Santas, 1988).

Conclusion

Physokermes hemicryphus occurs widely in England and has been misidentified in the past as *P. piceae*. A large population was found in East Yorkshire damaging a single ornamental spruce tree. This appears to be the first reported case in the UK whereby the population levels of the scale have been high enough to be damaging. *Physokermes hemicryphus* is a very common pest of ornamental spruce trees in central and southern Europe and there is a risk that it will become more abundant and economically important in Britain with climate change. There is, however, a complex of natural enemies already present in Britain, which is likely to provide some control of the pest.

The significance of finding first instars *P. hemicryphus* in May 2008 is unclear, but the preceding February was unusually mild and presumably at least one overwintering second instar matured early and laid eggs. This would suggest that the lifecycle of *P. hemicryphus* in Europe is more variable than previously reported and the eggs may be laid and hatch early in the year if climatic conditions are suitable, which may occur in the future as a result from climate change.

The status of *P. piceae* in the UK remains uncertain, as all the slide-mounted *Physokermes* teneral adult females and second instars deposited in the collections of the NMH and the CSL were *P. hemicryphus*.

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SHORT COMMUNICATION

Bagous lutulentus **(Curculionidae) in Oxfordshire, new for VC23.** – On 14.ix.2000 JC took two male *Bagous lutulentus* (Gyllenhal) (det JSD confirmed by Professor Mike Morris) at South Stoke, Oxfordshire (SU5882). The weevils were swept from a large patch of horsetail (*Equisetum*) in riverside marsh beside the Thames. Subsequently three females were found in pitfall traps set beside species-rich marsh dykes, between 14.xii–3.v.2005, at Otmoor (SP5614). These represent the first records for this weevil in Oxfordshire. – JOHN M. CAMPBELL, 17 Shilton Road, Burford, Oxfordshire, OX18 4PA & JONTY DENTON, Old Hall Place, Hussell Lane, Medstead, Hampshire, GU34 5PF.

HYDROPSYCHE BULGAROMANORUM (TRICHOPTERA: HYDROPSYCHIDAE) REDISCOVERED IN ENGLAND

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ABSTRACT

The caddisfly *Hydropsyche bulgaromanorum* Malicky was rediscovered at several points along the River Arun, West Sussex, close to Arundel where the last British record was made in 1926. Larvae and pupae were found on stones along 11 km of river where it is tidal, and encompassed fresh and mildly brackish water.

INTRODUCTION

The dark chunky caseless larvae of the caddis genus *Hydropsyche* with their well armoured thoracic segments are easily spotted in running-water samples. Some species reach about 17 mm in length. The adults, like so many caddis, are rather undistinguished brown insects with a wing length of about 10–12 mm. Nine species occur in Britain.

Hydropsyche bulgaromanorum Malicky was recognised in Britain by Malicky (1984) from six specimens of adults in four European museums. These were from the River Thames at Kew (21 June 1866) and between Kew and Richmond, Greater London (15 August 1862 and 12 July 1864), at an unspecified site in Norfolk (1887) and Arundel, West Sussex (5 September 1926). All had been originally identified as *Hydropsyche guttata* Pictet. As no specimens had been found for a long time in Britain, Malicky presumed that *H. bulgaromanorum* was extinct here.

Hydropsyche bulgaromanorum was found on the River Arun, West Sussex, as a result of sampling undertaken by the Environment Agency in response to an abstraction proposal. The water company Southern Water wanted to increase water abstraction from the Arun, which could result in lower flows. A possible consequence of decreased flows was to allow saline water to penetrate further upstream at high tide in the tidal section of the river, and adversely affect freshwater invertebrate assemblages. In the Environment Agency's initial sampling, *H. bulgaromanorum* was found in the section of river that may be affected by increased exposure to saline water. In view of the unusual find, a second survey specifically for the caddisfly was quickly organised to assess its extent in the stretch of river likely to be affected by abstraction. This paper reports both sets of results.

METHODS

The River Arun is a lowland river flowing south over Lower Cretaceous clay and chalk to the English Channel. In its lower reaches it is a small river about 10 m across and shallow enough to be crossed at riffle sections in thigh waders. Where the tidal influence is strong, it is up to about 20m wide and, at high tide, several metres deep.

On 13 April 2005, the second author who then worked for the Environment Agency collected samples using its standard 3-minute kick-net sampling method from seven points on the River Arun, three on the River Rother and one on the River Stor shortly upstream of their confluences with the Arun (Fig. 1).

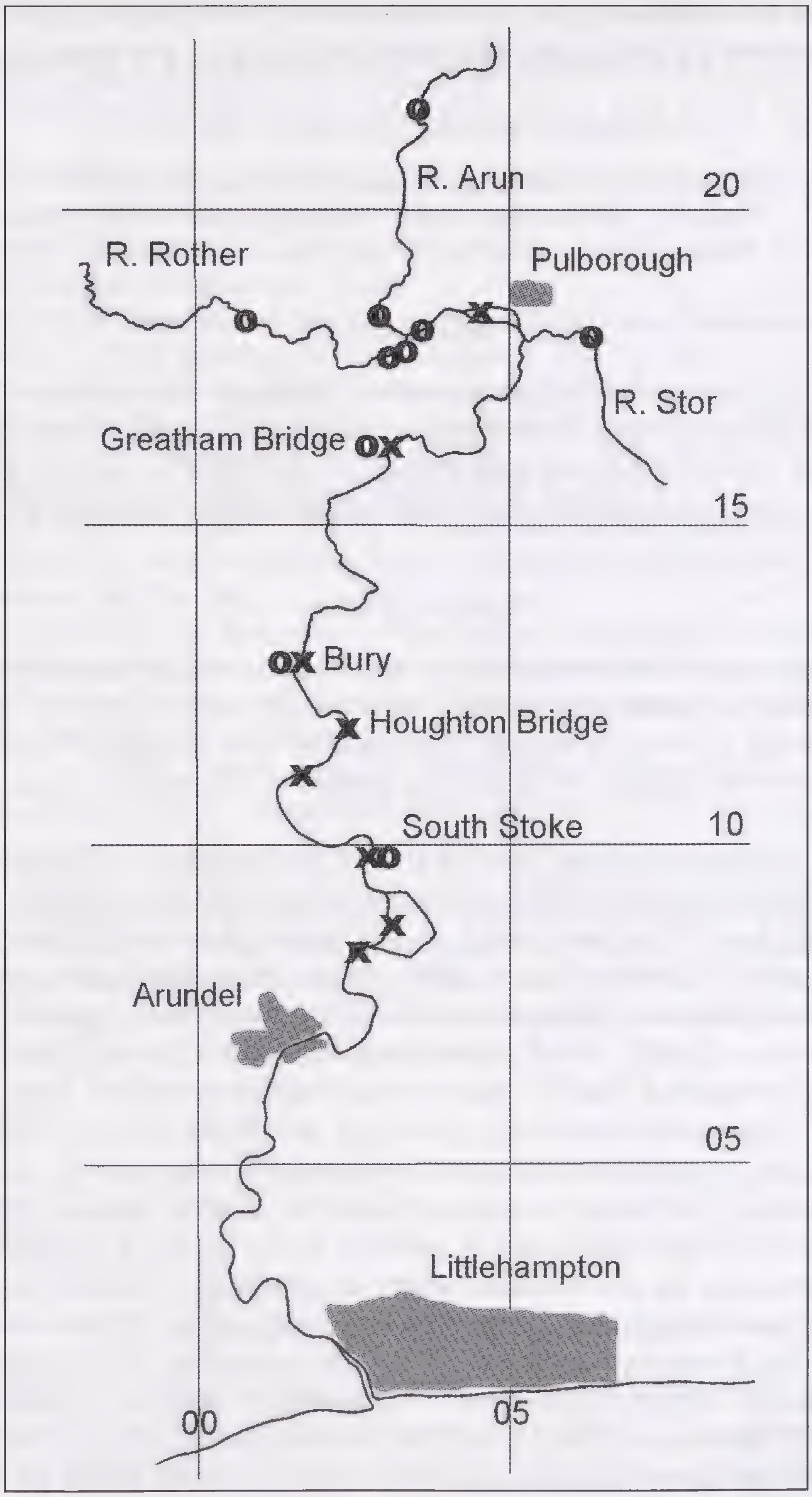

Figure 1. Map of the lower reaches of the River Arun, Sussex. Circles – sites sampled in April 2005; crosses – sites sampled in June 2005. Place names mentioned in the text are shown.

The survey dedicated to finding *H. bulgaromanorum* took place two months later on 14 and 15 June 2005. The first author visited a series of sites from the town of Pulborough to just upstream of Arundel, which was the site of the last known British record. These encompassed the stretch of river where the caddis had been located in the April samples and ranged from completely freshwater to strongly brackish water. Sampling points were selected on the basis of solid substratum having been recorded by Dr Martin Willing who had walked the entire stretch during a mollusc survey.

The river had to be sampled within three hours of low tide as only then could the bed, which is almost always submerged, be safely reached by wading. By working upstream, starting about three hours before local low tide, several sites were visited before deep water covered suitable river bed.

Pond-netting and kick-sampling failed to produce any *Hydropsyche* but it was soon discovered that larvae and pupal cocoons could be found more easily by lifting and inspecting individual stones. Most sampling in the later part of the survey was by direct searching, although pond netting was the only suitable method at some places where stones were under water too deep to reach by hand. The time spent at each site ranged from about 20 minutes to over an hour, depending on how productive a site appeared. All specimens of *Hydropsyche* were collected and preserved in the field.

The identity of pupae was established from the cast larval sclerites left in the cocoon case. The fronto-clypeus of *H. bulgaromanorum* has characteristic feathered hairs that trap silt and obscure the head pattern. The hairs were lost from the fragmented sclerites but the pattern became far clearer than on whole larvae, as did conspicuous punctures of the stouter setae typical of the genus. The small mentum, with its characteristic central tubercle, was also sometimes retrieved. No pharate males were found but it is unlikely that the genitalia would have provided a better means of identification than the discarded larval sclerites.

All identifications were done by the first author.

Results and observations

The tidal influence on the Arun is felt several kilometres upstream of Pulborough, well over 20 km from the sea. The fauna collected in April 2005 showed no indication of being particularly stressed by brackish water at Greatham Bridge, several kilometres downstream of Pulborough, although the brackish water amphipod *Corophium multisetosum* Stock, which is a frequent estuarine species, was found at this site, and some effect was indicated by the presence, and often abundance, of the brackish-water amphipod *Gammarus zaddachi* Sexton from shortly above Pulborough where it started to replace the freshwater *G. pulex* L. An impoverished fauna with no mayflies and few molluscs was found at Houghton Bridge. The Environment Agency samples therefore showed a transition from a fauna of completely freshwater to one of strongly brackish water.

In the April samples, four last-instar larvae of *H. bulgaromanorum* were found at Greatham Bridge (TQ031162) and three from South Stoke (TQ027100), these sites being separated by about 10km of meandering river. A few *Hydropsyche contubernalis* McLachlan were also present at both these sites and *H. siltalai* Döhler and *H. pellucidula* (Curtis) were present well upstream of Pulborough on both the Arun and Rother.

In samples collected in June, species of *Hydropsyche* were found at all sampling stations upstream of South Stoke (Table 1). *Hydropsyche bulgaromanorum* was present between South Stoke and Bury. *Hydropsyche contubernalis* overlapped with this distribution, and *H. pellucidula* was present upstream from Greatham Bridge where *H. bulgaromanorum* and *H. contubernalis* appeared to be close to their upstream limit. The cut-off in the distribution of these three species along the 5km stretch between Greatham Bridge and Pulborough was not determined as the river here could not be accessed in the time available.

The three most downstream sites where no *Hydropsyche* were found were broad, deep sections of river where solid substratum was scarce. The river downstream of Offham (TQ024083) was particularly deep and solid substrate was limited to chalk

Table 1. *Hydropsyche* species in the River Arun in West Sussex recorded in June 2005 (or April where indicated). Roman numerals indicate the instar (V = fifth, final instar, P = pupa).

Site, Grid reference	Habitat	*Hydropsyche bulgaromanorum*	*Hydropsyche contubernalis*	Other *Hydropsyche* species
South Stoke a TQ027101	Boulders immediately below and just downstream of bridge. Slow current at accessible stones.	2 V 3 V in April	1 III 1 IV 1 larva in April	sp. indet. (pupal skin in cocoon)
South Stoke b TQ027101	Almost clean stones in moderate current at low tide.	1 V 1 P (♀)		
South Stoke c TQ027101	Similar to South Stoke b.	8 P 2 empty pupal cocoons		sp. indet. (2 empty pupal cocoons)
Houghton Bridge TQ012118	Small to large clean stones of chalk, flints and possibly clinker; extensive sponge (Porifera) coverage. Fast current under bridge.	2 IV, 10 V (one about to pupate), 1 P (♀)	1 III 2 IV	sp. indet. (empty pupal cocoon) sp. indet. probably II (head 0.25 mm) sp. indet. probably III (head 0.65 mm) sp. indet. 1 P (♀, no larval fragments)
Bury TQ017130	Mainly silt with occasional large moderately clean stones. Slow current.	1 V 1 P (♀)		
Greatham Bridge TQ031162	Large boulders and stones, fine gravel shoals, extensive concrete skirt to the bridge. *Schoenoplectus lacustris* frequent. Fast current.	1 V in April	2 III 5 larvae in April	*H. pellucidula* 1 V
Pulborough TQ046184	Abundant macrophytes, clean stony bed. Fast current.			*H. siltalai* 5 V, 2 P *H. pellucidula* 2 V sp. indet. 2 dead P

and flint boulders used in bank defences, exposed chalk bedrock and small pebbles, most of which was covered in a thick layer of silty algae. Indications of the saline conditions here were the presence of the silt-dwelling brackish-water anthurid isopod *Cyathura carinata* (Kröyer) and the scarcity of molluscs other than *Theodoxus fluviatilis* L. which tolerates brackish water (Kerney, 1999). Shortly upstream by a bridge at Offham (TQ030086) there was more chalk and flint gravel, stones and some boulders and chalk bedrock 50m downstream from the bridge, but most stones were covered with a layer of silt and algae several millimetres thick. Finally at TQ027093, about 0.75 km downstream of the first positive site for *H. bulgaromanorum* at South Stoke, there was more exposed chalk bedrock and boulders within a very silty area but very few loose stones. These sites where no *Hydropsyche* were found were characterised by being particularly silty, owing perhaps to the wide channel and consequent low current, lacking small stones even though hard surfaces were present, and being presumably brackish for considerable periods of the day since the fauna noted in the field was impoverished and dominated by brackish-water species.

Sites where *H. bulgaromanorum* was present were characterised by having stones that were usually fairly free of silt, moderate or fast current (at low tide), and were likely to be covered by 2–3 m of water at high tide, although the water was clearly shallow enough at low tide to be sampled by hand. The size of stones on which larvae and pupae were found was not measured but they were in the range 5–15 cm long. The direction and speed of the current varied depending on the state of the tide. Salinity varied from completely freshwater at the most upstream site (Greatham Bridge) to clearly brackish at the downstream site (South Stoke) where *Fucus* seaweed grew.

Altogether, 16 larvae and 11 pupae of *H. bulgaromanorum* were found in June but only seven early instars of *H. contubernalis*. In contrast, the Environment Agency samples taken in mid April contained four fifth (final) instar larvae of *H. bulgaromanorum* and six of *H. contubernalis*. *Hydropsyche bulgaromanorum* had just reached the start of its emergence period by mid June, and no larvae smaller than fifth instar were found in either the April or June samples, so this species may have a life cycle resembling those of *H. siltalai* and *H. instabilis* (Curtis) illustrated by Edington & Hildrew (1995). Malicky (1984) shows that the combined European records indicate a flight period from May to October, with a peak in July and August; the postulated life cycle of the Arun population fits this pattern. It appeared that *H. contubernalis* emerged in the Arun before mid June and possibly early enough for larvae of the next cohort to have reached the third and fourth instars. If the life cycle is univoltine, it may be similar to that described for *H. pellucidula* which shows rapid growth in spring, early emergence (May, June) and an extended period as the final instar which overwinters (Edington & Hildrew, 1995). However, in mid France both species may have two generations per year (Lecureuil *et al.*, 1983).

The pupal cocoons of *H. bulgaromanorum* were attached mainly to the side or underside of stones. As in other caseless caddis, they were composed of moderately tough silk holding together small stone grains (1–10 mm), fragments of wood and various live molluscs including *Potamopyrgus antipodarum* (Gray), *Theodoxus fluviatilis* and *Bithynia tentaculata* (L.). Larvae appeared to make a crude loose tunnel with small grains attached, although its construction was not closely inspected as the tunnels collapsed when the stones were withdrawn from the water. The position of many larvae was probably also under or on the side of stones, although this was less clear-cut than for pupae. A fragment of the larva's food-collecting net attached to one pupal case had mesh dimensions about 0.375×0.210 mm, which is similar to values for the nets of *H. pellucidula*, *H. instabilis* and *H. siltalai* (Edington & Hildrew, 1995).

Head capsule widths provide a method of determining the instar once the range of values is known. Edington & Hildrew (1995) give the widths for seven species of *Hydropsyche*, excluding *H. bulgaromanorum* and for only the last two instars of *H. contubernalis*. Fifteen complete fifth instar *H. bulgaromanorum* had head widths averaging 1.53 mm with a range of 1.35–1.70 mm (measured to the nearest 0.05 mm); the smallest was a prepupa in a case so was not a large fourth instar individual. There was a suggestion of bimodality in these limited data that may have been due to sex. Three fourth instar larvae of *H. contubernalis* from the Arun had widths similar to those given by Edington & Hildrew (0.9–1.0 mm compared to their values 0.80–0.96 mm), and four third instar larvae had heads 0.60 mm wide. These values for third instar larvae are within the range of other species of *Hydropsyche*. The smallest specimen, whose identity was impossible to determine, had a head 0.35 mm wide, and was presumably a second instar larva since this value is within the range for most other *Hydropsyche*.

On 25 June 2005 Peter Barnard (*pers. comm.*) caught a single female of *H. bulgaromanorum* at Offham, just north of Arundel, which helps to confirm the identity of the species. This specimen was beaten from trees overhanging the river. Subsequent attempts have failed to find any further adults, though this may reflect a brief flight period or a restricted choice of adult resting sites.

Discussion

The rediscovery of a large caddis in the well-studied south of England suggested that it has been present at very low densities since M. E. Mosely found his specimen at or near Arundel in 1926. A number of reasons may explain its apparent absence for so long. Hydropsychid larvae are one of the easiest to recognise to family level and there have been workable keys for many years but, until the publication of the key by Edington & Hildrew (1995), larvae of *H. bulgaromanorum* would have been confused with those of *contubernalis* using the earlier edition (Edington & Hildrew, 1981) or Hildrew & Morgan (1974). Most work on larvae is done on behalf of the water industry but the tidal stretch of river where *H. bulgaromanorum* was found is further downstream than would normally be included by the Environment Agency for monitoring water quality. Caddisflies are one of the groups less popular with recorders, and *Hydropsyche* is one of the more difficult genera to identify as adults, so probably gets ignored. Finally, the difficulty of access (slippery clay and rocks in deep turbid tidal water) and generally unprepossessing aspect of the banks of the lower Arun makes them an unlikely site for amateur entomologists to want to study. Thus while the discovery is of interest, targeted survey in similar tidal rivers is likely to show a slightly wider distribution.

The population of *H. bulgaromanorum* extended along at least 11 km of the tidal section of the Arun but was probably patchily distributed owing to its apparent dependence on hard surfaces. Where it occurred, the population appeared to be robust, notably at South Stoke and Houghton Bridge. Although no samples were taken from areas with only mud substratum, it seems unlikely that the larvae would tolerate such conditions. It is almost certainly restricted to stony bottoms and, judging from its abundance on clean stones in moderately fast flowing water, only where the stones are not smothered in stabilised silt. Such areas appeared to be restricted to the vicinity of bridges, and this may be due to a number of reasons, such as bridges being built across narrower and therefore faster-flowing parts of the Arun, or because stones were dumped into the river to provide foundations, or because the bridges themselves increase turbulence and scouring. Further refinement of the

population's size and extent would be helped by establishing the nature of the bottom in the channel's centre where suitable clean stones may be more extensive than appeared from the margins. The sites also had bank-side shade cast by the bridges, bushes and trees, and contrasted with the exposed countryside along much of the river passing through pasture in the centre of the floodplain. Shade or shelter may be important to adults, although abundant tall reed (*Phragmites australis*) also provided considerable shelter along most banks.

At its lowest point at South Stoke, the population lived in water that was clearly brackish whereas at its uppermost point at Greatham Bridge there were fewer obvious signs of brackish influence; for example, bulrush (*Schoenoplectus lacustris*) grew profusely and the Environment Agency samples included at least nine species of molluscs and three species of leech, many of which are intolerant of mildly brackish conditions. The caddisfly therefore appeared to tolerate the transition from freshwater to brackish water. The population may be limited downstream by either high salinity or excessively silty bed conditions. These findings agree with the known distribution of *H. bulgaromanorum* on mainland Europe where it is found in the lower reaches of large rivers, although no specific tolerance of brackish conditions appears to have been noted.

Since finding *H. bulgaromanorum*, it has been added to the latest UK Biodiversity Action Plan with actions to survey for new sites and monitor known sites, which at the moment is just the Arun (*www.ukbap.org.uk*, 2008). It is hoped that the information from these brief surveys helps to identify likely sites to search for this rare species.

Acknowledgements

The authors thank Dr Ian Wallace for confirming the initial identification and supplying literature references. Dr Martin Willing provided information on the distribution of potential sites. The work was funded by Atkins Water and the Environment Agency, and Kim Hunter of Atkins Water helped CMD with the dedicated search. We thank Southern Water for permission to publish the results.

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BOOK REVIEW

British Lonchaeidae Diptera Cyclorrhapha, Acalyptratae. Handbooks for the Identification of British Insects Vol. 10 part 15 by Iain MacGowan and Graham Rotheray. 142 pp., 19 plates, 12 distribution maps. Published by the Royal Entomological Society/Field Studies Council, 2008. Soft-cover £21.00. ISBN: 978 090154 688 3.

The Lonchaeidae are a family of mainly black-bodied tephritoid flies with about five hundred species in nine genera known from all the major forested land masses except for New Zealand. Forty-six species within five genera have been recorded from the British Isles (not including *Neosilba batesi* (Curran) which was intercepted in fruit arriving from the Carribean) compared with ninety-seven species in eight genera for Europe as a whole. Factors such as the mild and wet climate, coupled with woodland diversity and management, mean that the British Isles have a relatively rich fauna surpassed only by the Czech Republic with fifty-four species.

This Handbook is divided into twenty-four sections with a substantial chapter given to the ecology, distribution and status of the species. The latter provides a useful summary of the diagnostic characters of each species which, while not as complete as in some key works, is an improvement on previous volumes in the series. Note, however, the editorial errors on pages 91–92 concerning *Lonchaea iona* and *L. fraxina*, pp. 104–105 (*L. hackmani* and *L. peregrina*), pp. 106–107 (*L. ragnari* and *L. bukowskii*), pp. 110–111 (*L. scutellaris* and *L. fugax*) and pp. 120–121 (*L. laxa* and *L. affinis*).

The keys cover adults of the European genera, British species and early stages of British saproxylic groups and almost every couplet is illustrated to the immediate right. This is, again, an improvement on earlier Handbooks where figures were either scattered within the text or included as a post script. A further twenty-four pages of illustrations show the male and female genitalia, larval head skeletons, posterior spiracles of the puparium and larval locomotory organs.

The nineteen plates are variable in their usefulness with seven showing just wood! Eight of the maps show the broad distribution of selected *Lonchaea* species in the British Isles and two of these, plus *Dasiops calvus* and *Lonchaea caledonica,* have their European range mapped.

One reservation concerns the invention of English names for the species on the spurious grounds that "they can act to make what may be rather obscure species with difficult Latin names more easily accessible". As the people likely to use the Handbook are dipterists with the resources, and skills, to make microscopic preparations "Scarce broad-bladed lance fly" rather than *Dasiops hennigi* will have little impact.

This book is an important addition to the key works of the British fauna but, given the rate at which the authors have added species over the past decade, will probably soon be out-of-date.

LAURENCE CLEMONS

PSAMMOTETTIX HELVOLUS (HEMIPTERA: CICADELLIDAE) NEW TO BRITAIN

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ABSTRACT

The deltocephaline leafhopper *Psammotettix helvolus* (Kirschbaum), is reported for the first time from Britain. Notes on the taxonomy, distribution and biology of this taxon are given.

INTRODUCTION

As part of a Defra-funded project (BD1414) aiming at the enhancement of arthropod diversity in the UK, the Auchenorrhyncha were monitored on more than 100 chalk grassland sites in southern England covering parts of the Chilterns, North Downs, South Downs, South Wessex Downs and the Isle of Wight (Masters, 2004). One of 110 Auchenorrhyncha species recorded during this project, *Psammotettix helvolus* (Kirschbaum) (Cicadellidae), is an addition to the British list. This species proved to be rather common and widespread throughout most regions surveyed suggesting that it is not a new addition to the British fauna but has not been recognised due to difficulties in its identification.

Currently nine species of *Psammotettix* are known to occur in Britain (Le Quesne & Payne, 1981). The genus comprises species of high similarity. Even distinctions based on the shape of the male aedeagus often rely on rather subtle morphological differences. For this reason *P. helvolus* (Kirschbaum) has sometimes been treated as a subspecies of *P. cephalotes* (Herrich-Schaeffer) (Ribaut, 1952; Metcalf, 1967). In addition, *P. helvolus* itself may not be a single biospecies but comprise a group of very similar taxa. Regardless of their taxonomic status, none of these has seemingly been recognised as occurring in the British Isles so far. Males of *P. helvolus* may have been previously misidentified as *P. cephalotes*; females however, were more likely to have been mistaken as *P. confinis* (Dahlbom).

With the exception of the South Wessex Downs the species was encountered within all surveyed regions, with records coming from the following 19 sites (number of individuals in brackets):

Chilterns: Ivinghoe (SP962164) 28.ix.99, (1); Ivinghoe Hills (SP959168) 23.viii.99, (2); Ivinghoe Hills (SP960157) 11.vi.02, (1); *North Downs*: Great Farthingloe (TR283394) 12.x.99, (1); Great Farthingloe (TR301403) 03.ix.02, (5); Big Allington Central (TQ830574) 26.vi.02 (1); *South Downs*: Annington Hill (TQ163088) 13.vi.00 (5); 11.ix.00 (6); Beddingham Hill (TQ456065) 23.ix.00 (1); Bramble Bottom (TV570970) 23.viii.00 (59); Firle Beacon (TQ465058) 29.vi.00 (4); 22.viii.00 (12); 13.ix.00 (17); France Hill (TQ508029) 21.vii.98 (9); 15.vi.00 (4); Home Bottom (TQ392063) 14.vi.00 (16); 24.viii.00 (41); 4.x.00 (5); Mill Hill (TQ413052) 22.viii.00 (1); Outbrook Bank (TV511978) 20.vii.00 (5); Pleasant Rise (TQ513029) 5.ix.00 (3); Ringwood Bottom (TV571983) 23.viii.00 (4); Tenants Hill Farm (TQ146074) 5.ix.00 (5); Willingdon Hill (TQ575009) 28.ix.00 (5); *Isle of Wight*: Yaverland Manor Farm (SZ620862) 3.viii.99 (10); 5.vii.02 (4); 12.ix.02 (1).

TAXONOMIC STATUS AND IDENTIFICATION

Although widely treated as a separate species on the continent (Nast, 1972, 1987; Holzinger *et al.*, 1997; Biedermann & Niedringhaus, 2004) *P. helvolus* (Kirschbaum) has been in the past sometimes been treated as a subspecies of *P. cephalotes* (Herrich-Schaeffer) (Ribaut, 1952; Metcalf, 1967). Furthermore, according to Remane (1987), there are two morphologically and ecologically distinct forms of *P. helvolus*. The specimens recorded now from Britain most likely belong to a morph preliminarily called 'helvolus basic', which is macropterous and lives on grasses in dry neutral to basic sites at lower altitudes (Nickel, 2003). A second taxon, provisionally called 'helvolus acidic', is brachypterous and occurs on acidic sites at higher altitudes in central Europe (Remane, 1987; Nickel, 2003). *Psammotettix helvolus* may very well comprise a group of valid taxa with very similar male genitalia. It remains unclear to what extent existing synonyms (e.g. *Jassus obtusiceps* Kirschbaum, *Deltocephalus rhombifer* Fieber, *D. substriatus* Then) might become applicable to these taxa if they turn out to be valid species.

Psammotettix helvolus (Kirschbaum) is widely distributed in Europe. It has been recorded from Albania, Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Egypt, France, Germany, Hungary, Italy (incl. Sardinia), Netherlands, Poland, Romania, Slovakia, Switzerland, Tunisia, Turkey and Russia (Nast, 1972, 1987; Kalkandelen, 1987). Metcalf (1967) additionally lists Scandinavia, though it is not mentioned as a species or subspecies by Ossianilsson (1983), and also England, though it was not included as a recognised species by Le Quesne & Payne (1981) in their updated checklist of British Auchenorrhyncha. Le Quesne refers to *P. helvolus* as a strictly mainland European species in an earlier publication (Le Quesne, 1969) and therefore does not include it in his key covering Britain.

Psammotettix helvolus is a species formerly confused most frequently with *P. cephalotes* (Herrich-Schaeffer) or *P. confinis* (Dahlbom). Identification of females using the 'Handbook for the Identification of British Insects' (Le Quesne, 1969) leads to *P. confinis*, whereas males key out as *P. cephalotes*. The main reason for this is that *P. helvolus* shares with *P. confinis* a similar outer morphological appearance (Fig. 1),

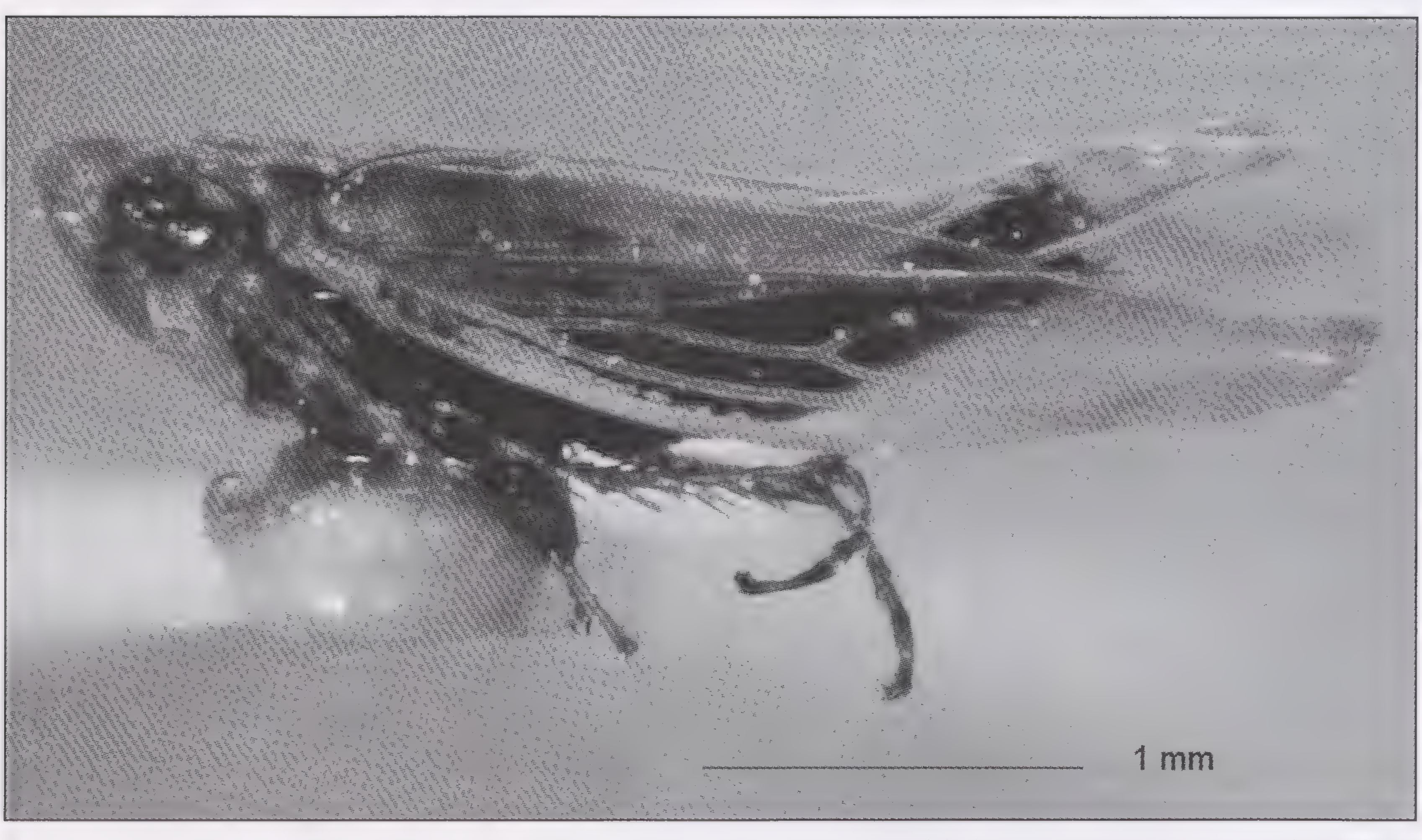

Figure 1. Habitus of *Psammotettix helvolus* (specimen from Whinless, Dover, Kent, 14.ix.2000).

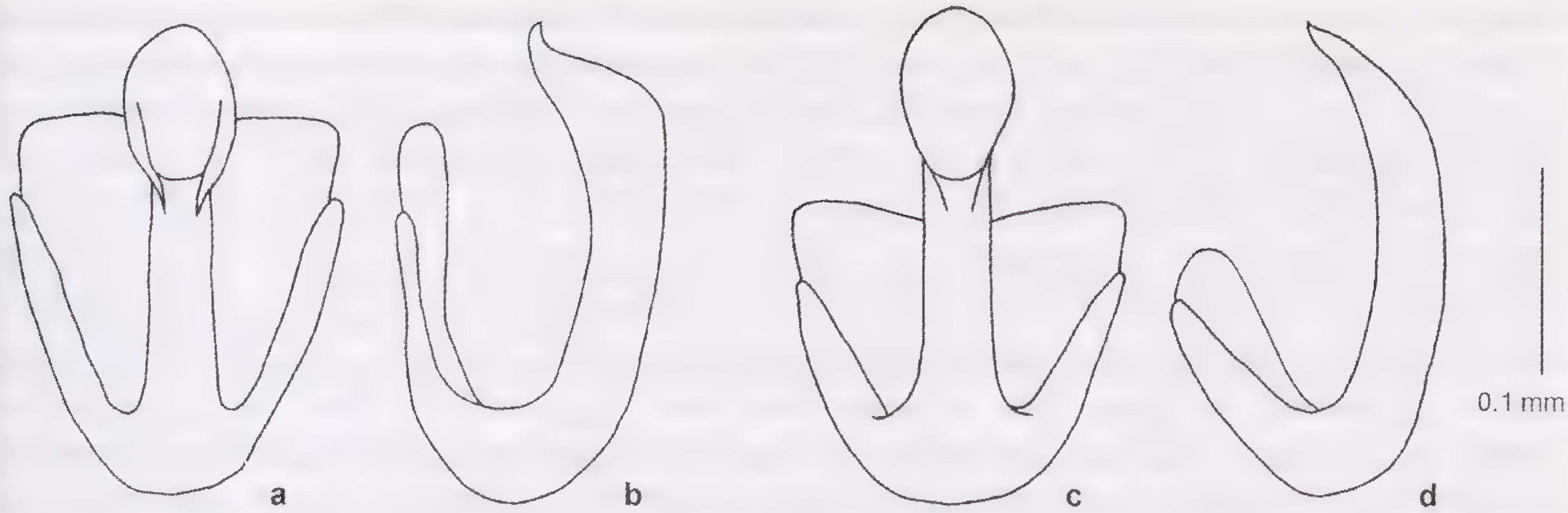

Figure 2. Aedeagus of *Psammotettix helvolus* (a from rear; b lateral view) and *Psammotettix cephalotes* (c from rear; d lateral view) drawings simplified from Ossiannilsson (1983) and Remane (1965).

which makes it impossible to distinguish between the females of the two taxa (Remane, 1987). By comparison, the aedeagus of *P. helvolus* appears very similar to that of *P. cephalotes* (see Biedermann & Niedringhaus, 2004). However, in lateral view the aedeagus of *P. cephalotes* is distinctively smaller distally, which is not the case in *P. helvolus* (Fig. 2). Also the aedeagus of *P. helvolus* ends in a much more upward curved point (Fig. 2). However, these two species are comparably easy to distinguish by other morphological features. *Psammotettix cephalotes* is characterised by submacropterous, completely hyaline and patternless wings just reaching to the tip of the abdomen. The body is generally unicolorous pale green (recognisable even after storage in alcohol for several years) and the eyes are black. In contrast, *P. helvolus* has more macropterous wings extending beyond the tip of the abdomen; part of the wing cells are bordered blackish forming a similar pattern to that of *P. confinis*. The body colour and markings are closer to those of *P. confinis*, notably the striped pattern of vertex and pronotum. The eyes of specimens preserved in alcohol are red.

Adjustment of key in Le Quesne (1969):

Couplet 7 of the key to the genus *Psammotettix* on page 92 of the Handbook is revised as follows

7 Fore wing greenish or yellowish, without dark markings; submacropterous, wings just reaching to the tip of the abdomen. Aedeagus seen from behind with stem narrow, its width at most one-sixth length of aedeagus; in side view with inner margin regularly concave almost to apex . . . . *P. cephalotes*

– Fore wings brownish with darker markings; macropterous, wings extending beyond the tip of the abdomen 7a

7a Aedeagus seen from behind with stem narrow, its width at most one-sixth length of aedeagus; in side view with inner margin regularly concave almost to apex . . . . *P. helvolus*

– Aedeagus either seen from behind with stem wide, its width one-third to one-quarter length of aedeagus or in side view with interior margin convex for part of its length. . . . . 8 (leading to *P. confinis* and *P. nodosus*)

Host plants and biology

On the continent *P. helvolus* inhabits mainly unimproved dry grasslands, pastures, abandoned fields, forest clearings, open forests, roadsides and sometimes even intensively managed meadows (Nickel, 2003). Its habitat requirements here range

from dry to moist conditions, with a preference for unimproved or only moderately improved sites (Nickel & Achtziger, 1999). *Psammotettix helvolus* can be among the dominant species inhabiting dry calcareous grassland in central Europe (Schiemenz, 1969; Rombach, 1999). However, it has also been suggested that the species is associated with nutrient rich conditions after observations of higher abundances in improved grassland compared to adjacent unimproved calcareous grassland (Bornholdt & Remane, 1993). *Psammotettix cephalotes* seems to be a K-strategist living monophagously on quaking grass (*Briza media* L.) in lean, usually permanent, stable grassland systems. By comparison, the long-winged form of *P. helvolus* seems to be more of an r-strategist living oligophagously on grasses and readily colonising disturbed or newly created grassland on neutral or basic soils (Nickel, 2003).

On chalk in England *P. helvolus* was most frequently encountered on the South Downs. Only three of the 19 sites with positive records of the species were ranked as unimproved chalk grassland. It was most abundant and frequent on improved and arable reversion sites. Consequently, *P. helvolus* is apparently a characteristic species of mesotrophic grassland (MG) according to the National Vegetation Classification (NVC), where it was observed as occasionally dominant and was significantly more abundant than on calcicolous grassland (CG of the NVC), where it occurred only sporadically. Under mesotrophic conditions, *P. helvolus* seems to completely avoid grassland characterised by the occurrence of *Arrhenatherum elatius* (MG1 of the NVC). It occurred most frequently and in highest densities in *Lolium perenne-Cynosurus cristatus* grassland (MG6 of the NVC). No significant preference for a certain sward height was recognised (Maczey, 2005). In summary, the results from this study are in accordance with observations from central Europe, indicating that *P. helvolus* is a pioneer species of disturbed sites, which can also be frequently found on intensively managed grassland. In addition, on the continental mainland it can also be a common species of unimproved calcareous grassland in contrast to its apparently rather rare appearance in this habitat in Britain.

Acknowledgements

The author wishes to thank Dr. Herbert Nickel for confirming some of the specimens of *P. helvolus* sampled in Britain.

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BOOK REVIEW

Control of Pests and Weeds by Natural Enemies: An introduction to biological control by Roy Van Driesche, Mark Hoddle & Ted Center. 484pp. (Blackwell Publishing, 2008). Softback £34.99. ISBN: 978-1-4051-4571-8.

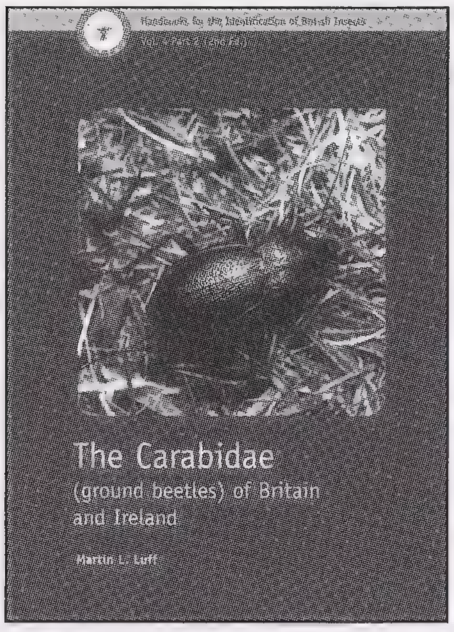
This is a great book. It is clear, very well organised and extremely well targeted at a late-undergraduate and masters-level audience.

The structure of the book and its component chapters are very logical, easy to navigate and build a very complete picture of this field and its current status. Throughout, the examples used are relevant and inspiring and contribute to a real sense of adventure and progress in the research and application of biological control. Complications, failures and drawbacks encountered in the field along the way are put with clarity and in context.

For a text book, the writing is fluid and delivers an enormous amount of factual information with ease. Sectioning invariably gives a staccato feel, but makes finding relevant points and useful information a very simple affair.

The only slight bones of contention in this otherwise excellent book are poor image selection in the colour plate section and little mention of the ancient origins of this field of research. These are minor points and I'm delighted to have a copy of this on my shelves.

TILLY COLLINS



The Carabidae (ground beetles) of Britain and Ireland by Martin L. Luff. 247 pp. 245 × 175 mm. Published for The Royal Entomological Society by the Field Studies Council. 2007. ISBN 978-0-90154-686-9. Soft back £19.00.

The handbook represents the 2nd edition of Volume IV Part 2 of the Royal Entomological Society Handbooks for the Identification of British Insects: Carabidae. The original edition, by Carl H. Lindroth, was published in 1974 since which time there have been many changes in classification and nomenclature. The edition is out of print and difficult to obtain second-hand and the compilation of an update is very opportune.

An introductory chapter discusses morphology and biology with general notes on identification, classification and nomenclature, followed by a systematic and synonymic checklist. Thirteen species are omitted which are either occasional introductions or which are considered to be extinct. This is offset by thirteen species which have been added since Pope (1977). Sub-fossil species are excluded and the British list thus currently remains at 357 species. Next follows the principal body of the handbook. Pages 30–200 are devoted to the dichotomous keys, firstly to subfamilies and tribes, thence to genera and species accompanied where appropriate by numerous explanatory marginal line drawings. Notes on each species follow every key in which the main distinguishing features of each species are outlined; also brief details of the habitat, typical distribution and an approximation of relative abundance, are provided. Some of the first edition keys were perhaps somewhat complicated and laborious to use and the opportunity has been taken to simplify the format. I have systematically 'tested' several parts of the keys over several months and find their use to be quick, accurate and very easy to understand. The handbook concludes with a bibliography of references, a comprehensive index, and finally 17 excellent colour plates (147 species representing 83 genera) prepared by James Turner of the National Museum of Wales. The plates enable the user to quickly achieve a cross-check to the accuracy of identification to genus, although personally, I find their positioning after the general index to be a minor irritant to regular reference use of the index.

The prime objective of the handbook is 'to enable the reliable identification of the adults of all the species of ground beetles that occur in Britain and Ireland'. In this respect, it succeeds admirably and used in conjunction with the Institute of Terrestrial Ecology's Provisional Atlas of the Ground Beetles of Britain 1998, also compiled by the same author, the user has available a very comprehensive source of reference and information.

Very reasonably priced, I regard the handbook as a 'must buy' both for the serious coleopterist and to anyone with a passing interest in this large and interesting group of beetles.

NORMAN HEAL

ERIOPHYES CANESTRINII (ACARI: ERIOPHYOIDEA), OBSERVATIONS ON A RARE MITE IN BRITAIN

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Abstract

Eriophyes canestrinii (Nalepa), a rare eriophyoid mite in Britain that is host specific to box (*Buxus sempervirens* L.), is reported from Somerset. Notes are provided on the host symptoms and damage, identification and geographical distribution of this mite species. Qualitative data are provided from the Somerset population as an aid to future studies. It is recognised that *E. canestrinii*, in common with many other eriophyoid species, requires redescription.

Introduction

On the 29 January 2007 a sample of *Buxus sempervirens* L. (Buxaceae) (common box) collected from a private garden in Brompton Ralph near Taunton, Somerset (VC 5) was received at the Central Science Laboratory (CSL) from Andrew Halstead (senior entomologist at the Royal Horticultural Society (RHS)). The sample was exhibiting symptoms of shoot and bud deformation. Dissection of some of the affected buds revealed the presence of many eriophyoid mites, the probable causal agent. Specimens were slide-mounted in Heinze's medium (Heinze, 1952) and identified as *Eriophyes canestrinii* (Nalepa). The find in Somerset is evidently the first record of *E. canestrinii* in Britain since that of Bagnall & Harrison (1928).

Four microscope slides of specimens have been deposited in the collection of the Natural History Museum, London (NHML) (Accession Number BMNH (E) 2008-44); three slides are deposited in the personal collection of Dr. Enrico de Lillo (Faculty of Agriculture, University of Bari, Italy) (catalogue numbers 79G, 80G and 81G); and eight slides are retained at CSL, together with intact galled buds preserved in 70% alcohol and dried herbarium samples (CSL 20701734).

Host symptoms and damage

Eriophyes canestrinii is a highly host-specific mite that lives and feeds on the new growth in and around the vegetative and flowering buds of *B. sempervirens*, causing distinctive and easily recognised host symptoms. As infested shoots mature, the feeding activity of these mites results in the main symptoms, severe leaf deformation and hypertrophy of both the vegetative and flowering buds, referred to commonly as 'bud blast' (Figures 1a–1b). Other symptoms are shortening of the internodes and the development of fine greyish hairs (erinea) on the deformed leaves and bud scales. There is only one published record of *E. canestrinii* causing economic damage (Kozlowski, 2002), which describes this mite as 'causing considerable losses on box [*Buxus sempervirens*] grown in orchards and nurseries' in Poland.

Identification

Nalepa (1890) published the name of a new species of eriophyoid mite, '*Phytoptus canestrinii*', causing damage to *B. sempervirens.*, but without any accompanying morphological information. We presume the specimens were collected in Austria,

although the locality is not specified. The description of *P. canestrinii* was published a year later (Nalepa, 1891). Nalepa later placed the species in the genus *Eriophyes* von Siebold (Nalepa, 1898), where it has remained. Nalepa (1930) divided the species into four subspecies with *E. canestrinii* the nominotypical subspecies. The three subspecies, *E. canestrinii tricheutes* (from France and Italy), *E. canestrinii crinites* (from Italy) and *E. canestrinii hypophyllus* (from Czechoslovakia and 'Holland'), were all recorded from *B. sempervirens*. The subspecies were differentiated by very slight morphological variations and apparent differences in their habitus (gall morphology). We are aware of only one published subspecies record, that being *E. canestrinii hypophyllus* on *B. sempervirens,* reported in Belgium (Vinnik & Casteels, 1998). The absence of any other subspecies records may indicate that the subspecies are rare or not recognized by other workers. Based on the variability observed within the population found in Britain, we feel that this subspecies division may not be justified.

The specimens collected in Somerset were identified to genus using Amrine (1996), and to species by comparing slide mounted specimens to both Nalepa's 1891 description and the later redescriptions of Nalepa (1930) and Denmark (1974). Slide mounted specimens were also sent to Enrico de Lillo, who agreed with our identification. The diagnostic characters used to identify the Somerset material as *E. canestrinii* are; 6-rayed featherclaw, unornamented dorsal shield, genital cover flap with longitudinal ridges and the distinctive sub-spherical opisthosomal microtubercles. The availability of this material enables us to add the following observations; in life, the adults of *E. canestrinii* are translucent white to pale yellow with an annulated vermiform body and two pairs of anterior legs: the females are approximately four times longer than wide whereas the males are approximately 3 times longer than wide. The dorsal shield in both sexes is unornamented and smooth (Fig. 1c), the female genital shield has 11–15 longitudinal ridges (Fig. 1d), the empodium, or featherclaw, has 6 rays (Fig. 1e), and the sternites and tergites are ornamented with sub-spherical, longitudinally elongate microtubercles (Fig. 1f). (Measurements (Table 1) were taken using a Zeiss M1 research microscope with digital imaging software (Axiovision)).

Geographical distribution and British records

Eriophyes canestrinii has been recorded widely, but infrequently, in Europe, including Austria (Nalepa, 1891 & 1930), Belgium (Vinnik & Casteels, 1998), Czech Republic (Nalepa, 1930; Šefrová & Laštůvka, 2005), England (Bagnall & Harrison, 1928), Germany (Fritzsche, 1964), Hungary (Ripka, 2007), Ireland (O'Connor *et al.*, 1995), Italy (Canestrini, 1892), Poland (Labanowski & Soika, 1995), Portugal (Carmona & Dias, 1980) the Netherlands (Nalepa, 1930 & Wageningen UR Digital Library) and the former Yugoslavia (Janezic, 1978). *Eriophyes canestrinii* has also been recorded in some parts of the USA (California (Keifer, 1952), Florida (Denmark, 1974)). There are only three published references to *E. canestrinii* in Britain. The first was by Bagnall and Harrison (1928), who simply listed *E. canestrinii* as species No. 73 in their catalogue of the British Eriophyidae, with references to Nalepa's 1898 account, a description of host symptoms (Schlechtendal, 1916) and Houard number H3907 (Houard, 1909). Bagnall & Harrison's records were based on host association and observed host symptoms, but no other collection details were provided. No material appears to have been collected or preserved and therefore none of their records, including their record of *E. canestinii*, can be verified, an issue discussed by Ostojá-Starzewski (2008). The second reference, in the Synonymic

Table 1. A comparison of qualititative data for female *E. canestrinii*. Measurements in µm.

Character	Nalepa, 1891	Nalepa, 1930	Denmark, 1974	Somerset, 2007 ($n=10$)
Body length	150	200	170	162–240
Body width	38	30–48	–	48–57
Prodorsal shield length	–	28–32	–	30–32
Prodorsal shield width	–	–	–	28–33
Genital shield length	–	–	–	12–15
Genital shield width	18	21	–	21–23
Genital shield ornamentation no. longitudinal ridges	12	–	12–14	11–15
Empodium rays	–	–	6	6
No. of opisthosoma tergites	55–60*	72*	–	76–87
No. of opisthosoma sternites			–	62–74

*No distinction made between tergites and sternites.

Catalogue of British Acari (Turk, 1953), repeats Bagnall & Harrison's record, but lists *E. canestrinii* as a *Species Incertae Sedis*. The third reference, Redfern, Shirley & Bloxham (2002), lists *E. canestrinii* without any further information. Contact was made with the British Plant Gall Society in our search for any unpublished records of *E. canestrinii*, but it had none (Janet Boyd *pers. comm.*, 2007), and neither are there voucher specimens of *E. canestrinii* in the collection of the NHML (Anne Baker, *pers. comm.*, 2007). The finding of *E. canestrinii* in Somerset in 2007 therefore appears to be the first verifiable record of this species in Britain.

Other Eriophyoids found associated with box

In addition to *E. canestrinii* (and the three subspecies described by Nalepa (1930)), four other species of eriophyoid mites have been described from *B. sempervirens* and *Buxus* spp. (Amrine & Stasny, 1994), with the following habitus and distribution:

Aceria unguiculatus (Canestrini) – Erineum, galls on buds. Italy (Canestrini, 1891b) and the former Yugoslavia (Janezic, 1978). Redfern, Shirley & Bloxham (2002) included this species in their guide to the British plant galls, but without citing any other reference, and we could find no published British records.

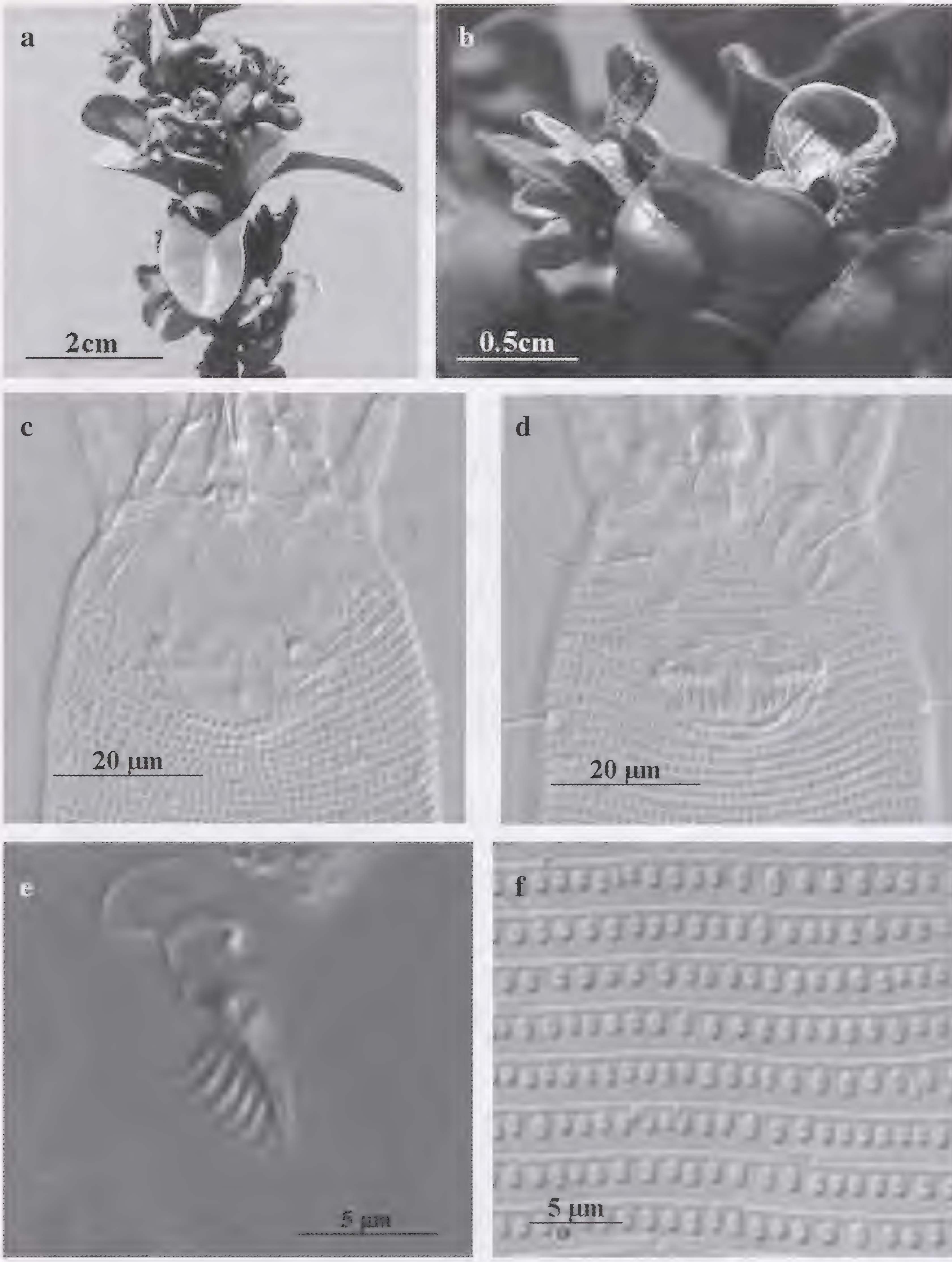
Calepitrimerus buxi Petanovic (2000) – a leaf and stem vagrant. North-western Serbia – not recorded in Britain.

Eriophyes buxi (Canestrini) – glabrous bud galls. Italy (Canestrini, 1891a & 1892), Hungary (Farkas, 1966) – not recorded in Britain.

Eriophyes parabuxi Keifer – a foliar vagrant. Described from specimens intercepted in the United States of America on *Buxus* sp. imported from England (Keifer, 1964). However, there are no records of this species being found in Britain.

Discussion

Eriophyes canestrinii is rare in Britain; a measure of this is the absence of any records from 1928 until the find in Somerset in 2007, if indeed the 1928 record is valid. Also, this is the first time the second author and Andrew Halstead (*pers. comm.*, 2007) have encountered this species in respectively over 22 and 37 years of work.



Figs 1a–f). (a) *Buxus sempervirens* showing leaf deformation and hypertrophy of the flowering buds, due to an *E. canestrinii* infestation. (b) Flower buds of *Buxus sempervirens* exhibiting typical 'blast' symptoms, due to an *E. canestrinii* infestation. (c) *E. canestrinii,* female, unornamented prodorsal shield. (d) *E. canestrinii,* female genital shield. (e) *E. canestrinii,* female, empodium (or featherclaw) showing 6 rays. (f) *E. canestrinii,* cuticular ornamentation. Sub-spherical and longitudinally elongate microtubercles.

There are at least three species of eriophyoid mites recorded from *B. sempervirens* that induce similar host symptoms. Therefore, species can only be separated with confidence by examining slide mounted specimens and even this can be a difficult task as the available descriptions are in many cases now inadequate for identification. A question mark also remains against Bagnall and Harrison's 1928 record of *E. canestrinii* because they clearly stated that most of their records relied on host association and host symptoms alone. Only on rare occasions would they examine slide mounted specimens, and we shall probably never be able to verify their record, as it appears that they did not save any reference material. The descriptions of *E. canestrinii* provided by Nalepa (1891 & 1930) are, by modern standards, inadequately detailed and this species could usefully be re-described. However, Nalepa did not retain the type series of the species he described. According to Amrine & Manson (1996), Nalepa's collection of preserved specimens still exists in Austria, in the Natural History Museum, Vienna, in the form of a series of vials labelled by host plant, but unfortunately the corresponding catalogue is currently lost. It therefore appears impossible to link Nalepa's remaining material to the specimens he collected in order to re-describe *E. canestrinii* using topotypic examples, neither is it possible to collect topotypic material, since the original site of collection is not recorded. The redescription of *E. canestrinii* and consideration of the status of its subspecies is not within the scope of this present study; however, it is intended that this work will be done at a later date when we have had the opportunity to examine more material. As an interim measure, qualititative data, comparable to that provided by Nalepa, taken from a random sample of ten female specimens from the Somerset population are presented as an aid to workers who may encounter this species (Table 1). The authors would welcome any additional British records of *E. canestrinii* backed-up with samples.

Acknowledgements

The authors would like to thank Andrew Halstead (RHS Wisley) for providing the source material, Janet Boyd (British Plant Gall Society) and Dr. Anne Baker (Natural History Museum) for their help in our search for British records of *E. canestrinii* and Dr. Enrico de Lillo (University of Bari, Italy) for his help in confirming our identification of *E. canestrinii*, alerting us to the original description of *E. parabuxi* and the information he generously provided. This work was funded by the Plant Health Division of DEFRA, under the authority of Licence Number PLH251B/5328 (02/2006) amended (04/2006).

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PTERANDROPHYSALIS LEVANTINA (HYMENOPTERA: TRICHOGRAMMATIDAE): A GENUS AND SPECIES NEW TO BRITAIN AND FRANCE

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ABSTRACT

The trichogrammatid *Pterandrophysalis levantina* Nowicki is recorded from England and France for the first time, from a single male and single female, respectively. The species is an ooparasitoid of weevils, including species that have been used for biological control of thistles. Originally described from Turkey, *P. levantina* is now known to be widespread in Europe and is also known from North Africa and California.

INTRODUCTION

An extensive survey of phytophagous insects, particularly leaf-miners and gall-formers and their parasitoids, was undertaken by the third author (J.B.) at two farms in the Bath (Somerset) area in early 2008 as part of a larger study of foodwebs in agroecosystems. Among the material resulting from this survey was one specimen of the distinctive male of *Pterandrophysalis levantina* Nowicki, never previously recorded from the British Isles. Subsequent examination of specimens in the collection of the Natural History Museum revealed a second (female) specimen collected in France in 1990, representing the first record of this species for France. *Pterandrophysalis levantina* is briefly redescribed and illustrated below to facilitate its identification, and available data concerning its biology and distribution are summarised.

Pterandrophysalis levantina Nowicki, 1935: 579.
(Figs 1–2)

Pterandrophysalis levantina Nowicki.
Doutt & Viggiani, 1968: 518–519; Pinto, 2006: 69–71.

Pterandrophysalis is a distinctive genus in the male sex (but see comments below on its possible synonymy with *Szelenyia*) and can be separated from all other trichogrammatid genera using the keys by Doutt and Viggiani (1968) or Pinto (2006), the latter only for genera known to occur in North America. *Pterandrophysalis levantina* is the sole representative of the genus, and can be further identified as follows:

Colour (unmounted male specimen): Head in frontal view dark brown/black around mouth and genae, becoming paler brown/orange towards frons but darker around ocelli; antennal scrobes bright orange/yellow; eyes purple; mesosoma and metasoma entirely dark brown/black, the axillae darker than the scutellum and mesoscutum; side lobes posteriorly orange; antennae and legs brown/black; distal tibiae and basitarsi orange; wing venation dorsally brown/black, ventrally yellow with a dark border.

Morphology (slide-mounted specimens, both sexes): Antenna with two anelli, two funicular and three club segments. Funicular segments distinctly separated from each

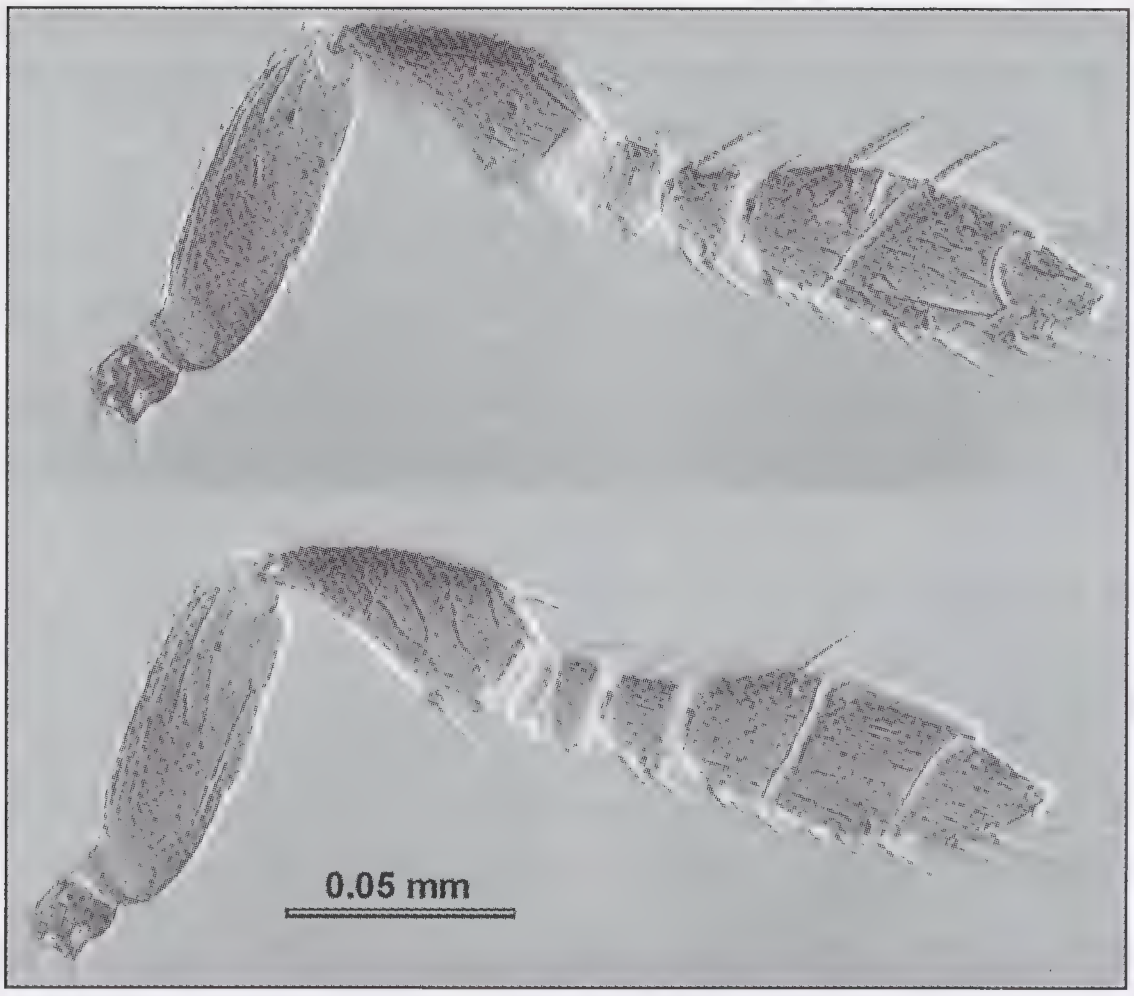

Figure 1. *Pterandrophysalis levantina* male antenna, ventral (above) and dorsal (below) aspects.

other and from club. F1 anelliform, wider than long, F2 transverse to quadrate (slightly larger in male, Fig. 1). Club widest at junction of first and second club segments, these approximately equal in size, the third club segment conical. Fore wing without distinct setal tracks except (in female) two extending from the stigma and radial process respectively, towards the distal wing margin. Male with marginal vein enormously inflated (Fig. 2).

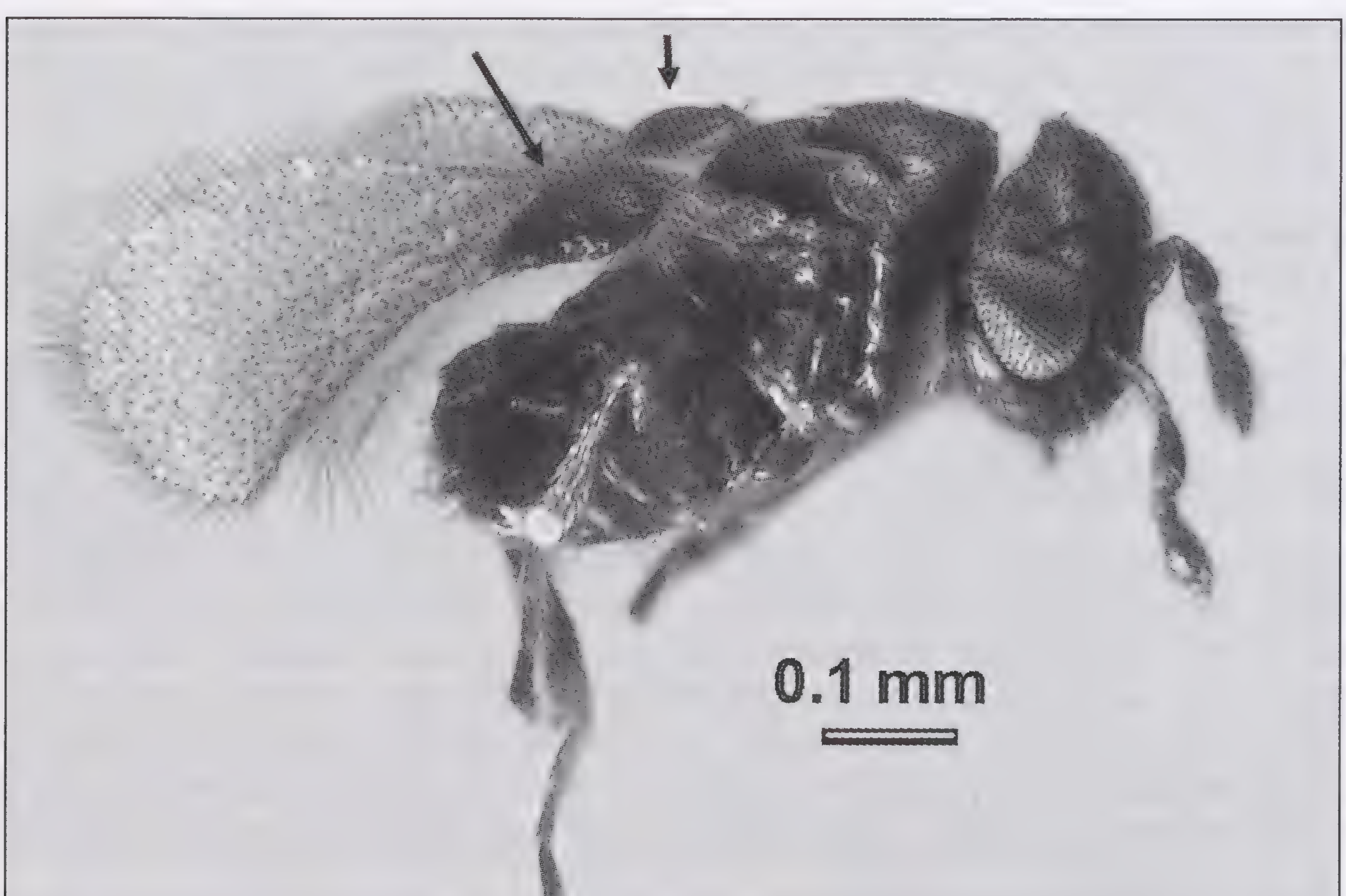

Figure 2. *Pterandrophysalis levantina* male habitus. Swollen marginal veins arrowed.

Although the very unusual fore wing distinguishes this genus in the male, Pinto (2006) has drawn attention to other important generic characters, including female characters, which suggest synonymy with *Szelenyia* Nowicki (1940). Pinto has suggested that a more complete study of Old World trichogrammatid genera needs to be undertaken before formalising that proposed synonymy.

Material examined: 1♂ ENGLAND: Somerset, Bath, Norton St Philip, Norwood Farm ST7756 (collection no.: N6RG$.11-11123). 29.iv.2008 (J. Brooks) *ex Cirsium vulgare* seed head. 1♀ FRANCE: Dordogne, la Rochebeaucourt 2.i.1990 (R. R. Askew) *ex Cirsium* (NHM).

Biology: *P. levantina* is an egg parasitoid of weevils (Coleoptera: Curculionidae) associated with thistles (Asteraceae), particularly in the genera *Centaurea* and *Cirsium*. Pinto (2006) reared it in Greece from eggs of *Bangasternus orientalis* (Capiomont), a species that has been introduced into California (see below), and apparently established, for control of *Centaurea solstitialis* L. In England, the species *Larinus carlinae* (Olivier) (formerly *L planus* (Fabr.)) and *Rhinocyllus conicus* (Froelich) are closely related to *Bangasternus*, and both are associated with thistles. The latter has been used as a biocontrol agent for thistles in the U.S.A. and Canada. It seems probable that one of these species is the host of *P. levantina* in England.

Distribution. *P. levantina* was described by Nowicki from material he collected in two localities in Turkey (Ankara and Uşak), with additional specimens from the disputed Hatay area currently in the far south of central Turkey, claimed at that time by Syria. These localities were Taina and Yenişehir near Lake Amq (also known as Lake Amik, Amik Gölu or Ak Deniz), which was drained in the latter half of the 20th century, and no longer exists. Pinto (2006) records specimens from Italy, Greece (1989), Tunisia and U.S.A. (2004, California, see above). Fursov (personal communication) has collected specimens in Ukraine, and this paper extends the recorded range of this very widespread species west and north to France and England.

Acknowledgements

The authors are grateful to Viktor Fursov for information on the occurrence of *P. levantina* in Ukraine, John Noyes for access to his Universal Chalcidoidea Database, John Pinto and Serguei Tryapitsin for information on collection dates and distribution. Max Barclay kindly provided information on possible weevil hosts of *P. levantina* in England. We would like to thank the owners of Norwood Farm for access to the study site. This work was supported by the Biotechnology and Biological Sciences Research Council [grant number BB/DO15634/1 Biodiversity on Farms: a complex systems approach].

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BOOK REVIEW

Urban Ants of North America and Europe: Identification, Biology and Management by John Klotz, Laurel Hansen, Reiner Pospischil and Michael Rust. Cornell University Press, November 2008. 216pp. Soft cover £13.95. ISBN 978-0-8014-7473-6.

If my admission to a non-entomologist of an interest in ants does not end our conversation, it frequently evokes an earnest request for an effective ant-killing strategy. Well, *Urban Ants of North America and Europe* provides the answer, plus a great deal more, from a team of authors representing both pest-controllers and academics. Moreover, as the competitive invader *Lasius neglectus* is spreading through Europe, and warmer summers may facilitate outdoor foraging and spread of pest ants currently restricted in Europe to heated buildings and greenhouses, this book is a timely reminder of the threats that some ants can pose to humans and their property, and to the wider environment.

Drawing on published, unpublished and online sources, including their own work, the authors focus on the ants likely to be encountered in urban environments in North America and Europe. These belong to five subfamilies, namely the Formicinae, Dolichoderinae, Myrmicinae, Ponerinae, Pseudomyrmecinae and Ecitoninae. Each of these is considered in its own chapter comprising a brief summary of subfamily characteristics, species checklist and one or more illustrated parallel dichotomous keys to relevant genera, subgenera, species groups or species. Also included in these chapters are detailed profiles, covering identifying characters, distribution, biology and control, for some major pests such as species of *Camponotus* and *Solenopsis*, *Linepithema humile* and *Monomorium pharaonis*. The keys have been adapted from a number of published and online sources and are 'based primarily on the worker caste'. The subfamily information is complemented by three additional chapters covering the biology and economic importance of pest ants, adverse human reactions to ant stings and bites, and ant management. The first of these includes a necessary key to the book's five subfamilies. The last is a clear, well-referenced review of chemical control strategies, habitat modification, biological control and integrated pest management. Tables detailing the scientific, American English, German, French and Spanish names for economically important ant taxa, the urban ants introduced into Europe, and the urban ants introduced into the United States, are presented as appendices preceding the list of cited references and the index. Apart from the keys, the book is illustrated with 39 black and white images, four diagrams and four colour plates.

I read this book with great interest, and appreciated its broad taxonomic scope, clear layout, easy-to-read textual style and numerous reference citations. I was less comfortable with the precedence given in the text (but not the keys) to vernacular over scientific names for those taxa with common names approved by the Entomological Society of America. In some places this compromises textual clarity. Also of note on the debit side is that page listings in the index are incomplete, and that the tabulated appendix listing the ants introduced into Europe does not include details of each taxon's current European occurrence. Nevertheless, the authors have put together a valuable reference for those concerned with urban ants and their control. They also offer much for anyone with a general interest in ants or in insects associated with humans, as well as information for those interested in invasive species.

Whilst *Urban Ants of North America and Europe* is not essential reading for entomologists concerned primarily with the British fauna, it is a fascinating read that is amazingly good value for money.

Glenda Orledge

HOST PLANTS OF A LEAF-MINING SAWFLY, *PARNA APICALIS* (HYMENOPTERA: TENTHREDINIDAE) IN BRITAIN

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ABSTRACT

Parna apicalis (Brischke), a leaf-mining sawfly on lime trees (*Tilia* spp.) has recently been recognised as being present in Britain. A search for mined leaves at the Royal Horticultural Society's Garden, Wisley, Surrey has shown that ten *Tilia* species and hybrids are host plants for this insect.

INTRODUCTION

Parna apicalis is widely distributed on the mainland of Europe but was not recognised as occurring in Britain until leaf mines on a small-leaved lime *Tilia cordata* on Tunbridge Wells Common, Kent were discovered in June 2007 (Edmunds *et al*., 2007). Also reported in the same paper, were similar, previously unidentified, mines found between Macclesfield and Stockport in 2006 and at Poynton, Cheshire in 2007. In 2008, further locations for this leaf miner were reported by contributors to the British Leafminers Newsletter (Edmunds, 2008). These were sightings of mined leaves in Bristol, Avon, Tunbridge Wells, Kent, Wrexham, Clwyd and at the Royal Horticultural Society's Garden, Wisley, Surrey. *Parna apicalis* may be a recently established insect in Britain but the wide distribution of records suggests it may have been present for a number of years and has been overlooked.

Liston (2006) noted the presence of *P. apicalis* mines (as *Parna reseri* Liston) on *Tilia cordata* Mill., *T. platyphyllos* Scop., *T. petiolaris* DC., *T. mongolica* Maxim, *T.* × *moltkei* Spath ex Schneid. and *T.* × *euchlora* K. Koch, but not on *Tilia tomentosa* Moench, amongst the lime trees growing in the Berlin Botanic Garden, Germany.

BRITISH HOST PLANTS

On 13.v.2008, *Tilia* species and hybrids growing in the Arboretum and other areas of the RHS Garden at Wisley, Surrey were examined for mines created by larvae of *P. apicalis*.

Tilia species, hybrids and cultivars with mined leaves

Tilia americana L. 'Dentata'
Tilia americana L. 'Redmond'
T. cordata Mill.
T. cordata Mill. 'Winter Orange'
T. 'Emerald Spire'
T. europaea L.
T. europaea L. 'Pallida'
T. heterophylla Vent.
T. heterophylla var. *michauxii*
T. mexicana Schldl.
T. mongolica Maxim.
T. orbicularis (Carr.) Jouin
T. platyphyllos Scop.

T. platyphyllos Scop. 'Laciniata'
T. tomentosa Moench

Tilia species and cultivars where no mined leaves were seen

T. 'Chelsea Sentinel'
T. chenmoui Cheng
T. chinensis Maxim.
T. cordata Mill. 'Lico'
T. cordata Mill. ssp. *sibirica*
T. dasystyla Steven
T. dasystyla Steven ssp. *caucasia*
T. dasystyla Steven ssp. *dasystyla*
T. henryana Szysz.
T. insularis Nakai
T. japonica (Miq.)
T. oliveri Szysz.
T. platyphyllos Scop. ssp. *corinthiaca*

It will be noted that some cultivars or sub species of *T. cordata* and *T. platyphyllos* appeared to be mine-free while others had mines. Further investigations in future years may reveal mines on those trees at Wisley that appeared to be free of mines in 2008.

On 13.v.2008, most of the mines seen at Wisley Garden were fully developed and some had been vacated by the fully fed larvae. It is likely that these larvae developed from eggs laid during April. *Tilia cordata* 'Lico', *T. henryana* and *T. japonica* are lime trees that come into leaf relatively late in the spring and their foliage may not be at a suitable stage of development when the female sawflies are laying their eggs.

There is another leaf-mining sawfly that feeds on lime leaves in Britain. This is *Parna tenella* (Klug). The mines of these two species can be readily distinguished. Those of *Parna apicalis* develop during May and have usually been vacated by the end of that month. The larva mines from the margin inwards, forming an elongate semicircular mine but without causing the leaf margin to curl into a roll. The faecal pellets within the mine are cylindrical and about 0.5 mm long. Mines of *Parna tenella* develop during June-early July. These mines also develop from the leaf margin but affected sides of the leaf become tightly rolled upwards towards the central vein. The faecal pellets of *P. tenella* are unusually large, being up to 2 mm long. Pictures of the mines and larvae of both species can be seen on the British Leaf-miners website (www.leafmines.co.uk/html/species_list.htm). *Parna tenella* has both males and females; *P. apicalis* appears to be a female only species. Other differences between the adults of these two species are given in Edmunds *et al.* (2007). The host plants of *P. tenella* recorded at Wisley and two other arboreta in England are given by Halstead (2004).

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OCCURRENCE OF THE GENUS *ELASMOSOMA* RUTHE (HYMENOPTERA: BRACONIDAE, EUPHORINAE) IN BRITAIN

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ABSTRACT

Numerous adults of the distinctive braconid wasp *Elasmosoma berolinense* Ruthe, now generally regarded as belonging to the subfamily Euphorinae, were present in catches during July to September from just one of a series of Malaise traps operated at Burnham Beeches, Buckinghamshire in 1996. The means to recognise this genus and species, which are new to Britain, are given.

BRITISH OCCURRENCE

During a survey at Burnham Beeches, Buckinghamshire, sponsored by the City of London, Malaise traps were sited at several locations during 1996 by J. W. Ismay, and I was much later able to go through the residual portions of the catches, still containing parasitic Hymenoptera, through the kindness of him, H. Read and P. J. Chandler. In samples from just one of the sites, at SU 946956 and labelled "moat", a large number of specimens of the small but distinctive braconid *Elasmosoma berolinense* Ruthe, were present, with date ranges as follows: 8–22.vii.1996 (4 ♀ 10 ♂); 22.vii–5.viii.1996 (31 ♂); 5–13.viii.1996 (1 ♂); 31.viii–13.ix.1996 (4 ♂) and 13–25.ix.1996 (4 ♂). [It is possible that I did not see the sample(s) for the period 13–31.vii.1996]. It is of interest, but unknown significance, that females were present in only the first sample, in which they were quite well represented, and that males were more abundant just afterwards and continued to occur for the next two months. This is the most widespread and least rare of the three European species of *Elasmosoma*, but the species are always local and the genus has not previously been found in the British Isles.

According to Helen Read (*in litt.*) the Malaise trap at the "moat" site was positioned just outside a medieval moat (a scheduled ancient monument) in a relatively moist area with ground flora dominated by *Calluna*, *Molinia* and *Pteridium* and a peaty soil overlaying the acidic gravels typical of the wider area. The trap was sited in a small clearing very close to ancient beech pollards, which are scattered across the historical wood pasture that constitutes this part of the site.

RECOGNITION

Elasmosoma berolinense is a small dark insect, ca 2 mm long, with highly characteristic wing venation (Fig. 1). It should key satisfactorily to 'Neoneurinae' in either Shaw & Huddleston (1991) or van Achterberg (1993). It can be distinguished from European species of the related genus *Neoneurus*, of which at least one uncommon species also occurs in Britain, as follows:

1. Antenna shorter than length of head plus mesosoma (in ♀ considerably so: Fig. 1), with 13 segments in ♀ and 14 in ♂; marginal cell of fore wing only

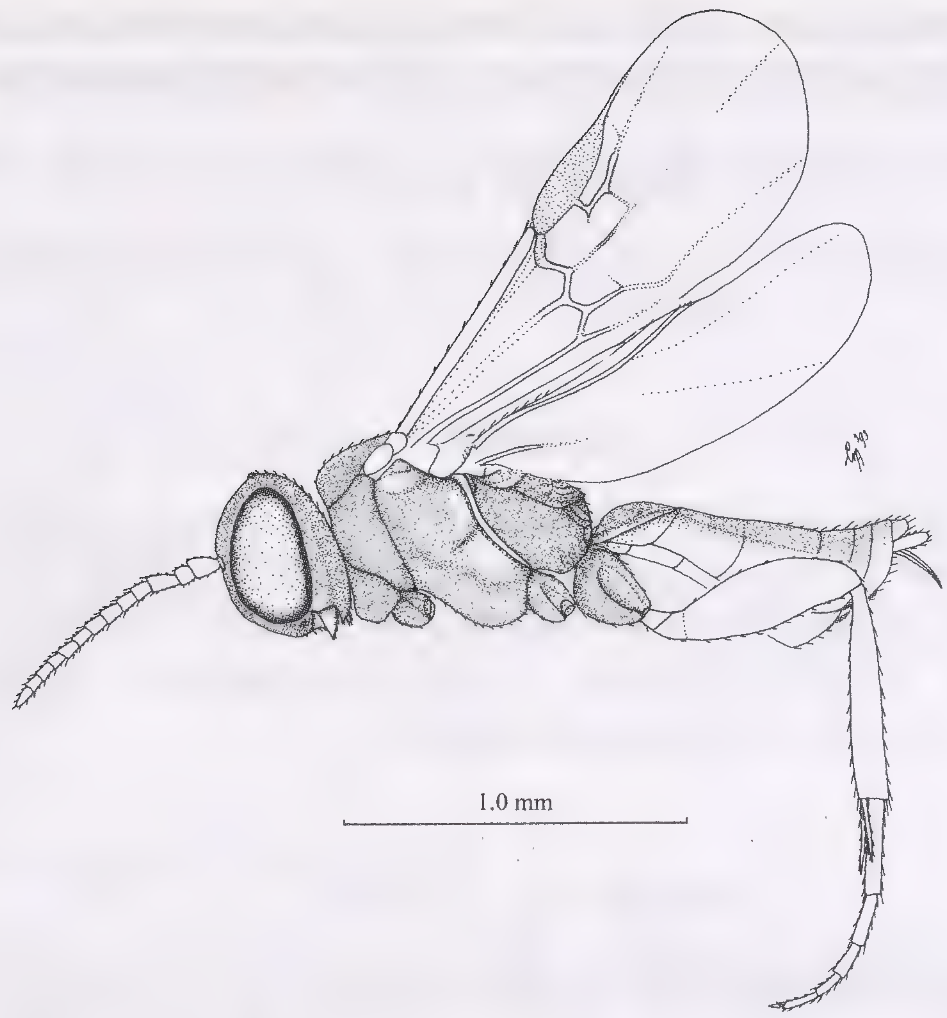

Fig. 1. Female *Elasmosoma berolinense* Ruthe, habitus (front and middle legs not shown). Courtesy of C. van Achterberg.

indicated, not closed by a fully pigmented radius, its cross-vein scarcely discernible; hind wing without closed cells; squat, length under 2.5 mm . . . . *Elasmosoma*

— Antenna clearly longer than length of head and mesosoma, with 16 segments in both sexes; marginal cell of fore wing well defined and with a pigmented cross-vein; hind wing with two closed cells; more elongate, length ca 3.5 mm . . . . *Neoneurus*

The three known European species of *Elasmosoma*, which are only easily separable in the female sex, are keyed and illustrated by van Achterberg & Koponen (2003). The present females, when still in alcohol, had the hypopygial branches splayed and thus resembled their Fig. 17 of *E. depressum* van Achterberg & Koponen, but after the specimens were dried these long branches curved inwards and tended to cross posteriorly, in the manner characteristic of *E. berolinense* (and no other European species). This change in appearance should be borne in mind if material is first examined in alcohol.

Systematic placement and biology

Elasmosoma and related genera had for some time been treated as the subfamily Neoneurinae, but molecular genetic evidence (e.g. Belshaw *et al.*, 2000; Belshaw & Quicke, 2002; Shi, Chen & van Achterberg, 2005; Pitz *et al.*, 2006) has increasingly strongly identified this group's position as a tribe Neoneurini within the subfamily Euphorinae, a diverse subfamily containing several genera exhibiting extreme morphological adaptations for parasitizing adult insects. This vindicates Tobias's (1966) earlier view, which was to an extent supported by Čapek (1970), that had subsequently been widely rejected until recently.

Females of *Elasmosoma* species have been known for over a hundred years to oviposit into the abdomens of worker ants of the genus *Formica* (cf. Tobias, 1966; Shaw & Huddleston, 1991) but it is only recently that the biology and immature stages (of a N. American species) have been described in detail (Poinar, 2004). Peter Chandler and Helen Read (*in litt.*) inform me that the wood ant *Formica rufa* L. is abundant more or less throughout the northern part of Burnham Beeches, including the moat site but also several other areas (perhaps drier and less open) in which Malaise traps had not collected *E. berolinense*. The occurrence of this parasitoid apparently in only one area (and there in some numbers) is difficult to explain, and merits further investigation.

Except that 3 ♂ have been donated to the Natural History Museum, London, and 1 ♂ to the Nationaal Natuurhistorisch Museum, Leiden, the above material is deposited in the National Museums of Scotland.

Acknowledgements

I am grateful to Helen Read of the City of London and John Ismay for donating parasitic wasps from the Burnham Beeches Malaise trap samples, to Peter Chandler for facilitating this, and to Kees van Achterberg for helpful discussion as well as allowing me to include his fine habitus figure of *Elasmosoma berolinense* constructed from parts first published in *Zoologische Mededelingen*, Leiden **67**(5): 63–74 (1993). Helen Read and Peter Chandler kindly commented on a draft and provided information about the site.

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BOOK REVIEW

True Weevils (Part II) (Coleoptera: Curculionidae, Ceutorhynchinae). Handbooks for the Identification of British Insects Vol. 5 Part 17c. by M. G. Morris, 136pp. (Royal Entomological Society, 2008). Price £25.00. ISBN 978 0 90154 687 6.

This is the fourth handbook in the series dealing with the identification of British weevils but the first in the new slightly larger format (242 × 174 mm) recently adopted by the Royal Entomological Society. The new layout, with text figures alongside the couplets instead of at the end of the book, makes the keys much more user friendly. The larger typeface is also a very welcome improvement.

The book begins with a clearly presented contents page, followed by brief 'Abstract' and 'Acknowledgements' statements. After a short Introduction there are sections entitled 'Biology' 'Life history and phenology' 'Economic importance' and 'Distribution'. Then there is a useful Glossary to explain specialised and infrequently used words and a checklist for the 93 species of British Ceutorhynchinae, with synonymy linking back to Pope (1977).

The illustrated keys to tribes, genera and species contain an impressive amount of detail and critical characters are clearly illustrated by drawings pasted alongside the relevant text. Genitalia have not been used for identification purposes, except in a few instances where dissection of males is considered unavoidable.

Detailed notes for each species are listed separately from the identification key. These consist of a short paragraph describing sexual differences and comprehensive notes on habitat, foodplants, life history and distribution, both in the British Isles and abroad. Red Data Book and notable statuses in Britain are also quoted.

There are six pages of references, followed by two separate tables on plant hosts and larval feeding sites, one in alphabetical order of weevil names, the other listing Latin names of foodplants alphabetically. The index lists scientific names of tribes, genera and specific names of weevils only. There are 15 immaculately presented whole-insect drawings by John Read which are placed as close as possible to the relevant text. The 18 colour plates by James Turner are printed on five pages at the end of the book.

There is still much to learn about weevils. One only has to flick quickly through the pages of this book to discover statements such as "biology unknown", "thought to be associated with", "not recorded from Scotland, Isle of Man or Ireland", etc. to realise that there is scope for every coleopterist to add to scientific knowledge. There is also considerable scope for monitoring changes in distribution, even for common species, since geographical ranges are rarely static but are either expanding or contracting for a variety of reasons.

It is very hard to direct criticism to any aspect of this book and the author must be congratulated for producing such a fine reference work that is likely to prove extremely useful for all interested in weevils for many years to come. Inevitably there will be occasional name changes and additions to the list of native British species, but surely it is the hope of adding to scientific knowledge that drives many entomologists along the path to discovery?

PETER HODGE

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RAPID RECENT SPREAD OF *ZYGINELLA PULCHRA* (HEMIPTERA-AUCHENORRHYNCHA: CICADELLIDAE) IN BRITAIN

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[1]*School of Life Sciences, University of Sussex, Falmer, Brighton BN1 9QG;* [2]*Leeds Museum Discovery Centre, Carlisle Road, Leeds LS10 1LB;* [3]*69 Westwick Gardens, Lincoln LN6 7RQ;* [4]*101 Crouch Hill, London N8 9RD;* [5]*Coppice Place, Perry Wood, Selling, Near Faversham, Kent ME13 9RP*

The leafhopper *Zyginella pulchra* Löw was recorded in Britain for the first time in September 2001 at East Malling in Kent (Bleicher, Orosz & Cross, 2007). No further records of this species emerged until early 2007, since when it has been recorded from a range of widely spaced sites across Britain (Fig. 1). Hitherto, the species in Britain has been collected mainly from yew, *Taxus baccata* L., and sycamore, *Acer pseudoplatanus* L., although overwintering specimens have now been found on a wide range of evergreen plants. The records that are known to us are as follows, presented in chronological order:

– Westdene, Brighton, West Sussex (TQ2908); 9–25.iii.2007, 23.ii.2008; various specimens found on cypress (Cupressaceae) bushes in suburban gardens; M. Oldfield; Lincoln (SK 959685), 6.xi.2007; on yellow flag, *Iris pseudacorus,* M.E.Talbot; Morden Hall Park, South London (TQ 262687); 2.xii.2007; on ivy, *Hedera helix*, J. Botting; Huddersfield (SE 156172); 21.xii.2007, one specimen on broom, *Cytisus scoparius*, JB; Boultham Park, Lincoln (SK 968678); 8.i.2008; abundant on yew, *Taxus baccata*, MET; Lincoln (SK 959685); 31.i.2008; one specimen on Leyland cypress, × *Cupressocyparis leylandii,* MET; Huddersfield (SE 159163); 23.i.2008 – iv.2008; males and females frequent on ivy and Leyland cypress, JB; Boultham Park, Lincoln (SK 969685); 28.i.2008; abundant on yew, MET; Lewes Cemetery, East Sussex (TQ 407098); 7.ii.2008; several males and females on yew, A. J. A. Stewart; North London (TQ 301879); 7.ii.2008; several on ivy and yew, T. Bantock; River Witham, Stamp End Lock, Lincoln (SK 947695); 10.ii.2008; abundant on yew, MET; Cathays Park, Cardiff (ST 1776); 11.ii.2008; numerous individuals on yew, M.R. Wilson; City Arboretum, Lincoln (SK 986717); 12.ii.2008; abundant on yew, MET; North London (TQ305878); 19.ii.2008; several from yew, TB; North London (TQ270871) 26.ii.2008; one on Swamp Cypress, TB; North Hykam (Millennium

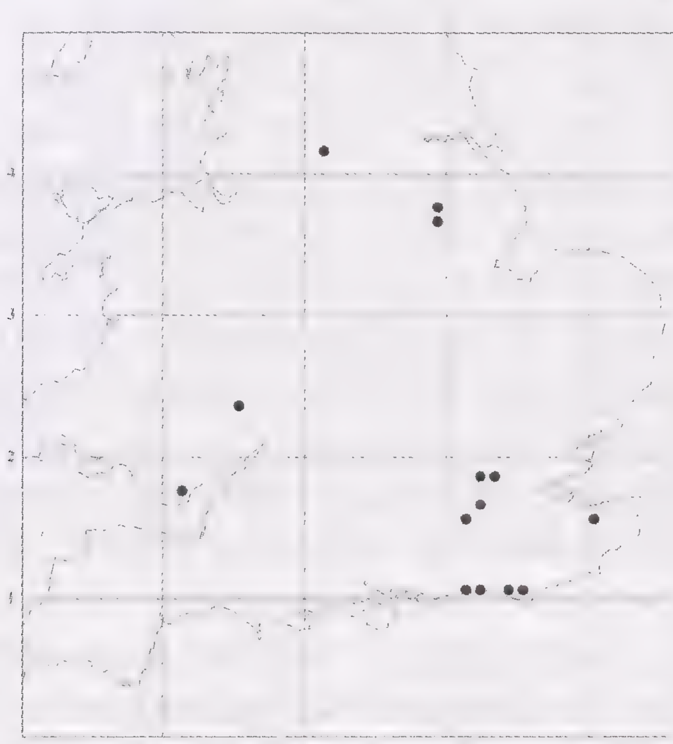

Fig. 1. Current records for *Zyginella pulchra* in Britain.

Green), Lincoln (SK 931677); 28.ii.2008; one specimen on grass, MET; North London (TQ273875); 13.iii.2008; several from yew, TB; Perry Wood, East Kent (TR 048558); 16.iii.2008; 2 individuals on yew, J. S. Badmin; Eign Gate, Hereford (SO 507399); 26.iii.2008; one female on yew, JB; Banana Park, Lincoln (SK 952685); 06.iv.2008; one specimen on bramble, *Rubus* agg., green form with first apical cell blue/black, MET; Lincoln (SK 959685); 01.v.2008; male and female, mating, MET; Huddersfield (SE 159163); 05.v.2008; abundant adults on sycamore, *Acer pseudoplatanus*, JB; Box Hill, Surrey (TQ173520); 06.ix.2008; male on apple, *Malus* sp., below sycamore, TB; Huddersfield (SE 159163); 12.ix.2008; abundant male and female adults, and rare late-instar nymphs on sycamore, JB; Lewes Cemetery, East Sussex (TQ 407098); 2.x.2008; one female on sycamore, AJAS; Willingdon, Eastbourne, East Sussex (TQ598017); 2.x.2008; one individual from conifer; JSB; Huddersfield (SE 159163); 11.x.2008; one adult on sycamore, but not found on Leyland cypress, JB; North London (TQ301891); 17.x.2008; one adult on Lawson's cypress, TB: Huddersfield (SE 159163); 18.x.2008; several specimens on sycamore, birch, *Betula* sp., and Leyland cypress, JB: Huddersfield (SE 156172); 18.x.2008; two specimens on Scots pines, *Pinus sylvestris*, JB: Worthing, East Sussex (TQ132023); 25.x.2008; one male, near *Rhododendron*; Brian Valentine.

Other localities where *Z. pulchra* has been specifically searched for on yew trees but without success are Totnes, Devon; Harpenden, Hertfordshire; Gwynedd, North Wales (Tristan Bantock) and Llandrindod, Mid Wales (sycamore also examined during x.2008; J. Botting).

When collected from yew or Leyland cypress, *Z. pulchra* is invariably found together with *Empoasca vitis* (Göthe) (and sometimes *E. decipiens* Paoli), the latter often in profusion. Other Auchenorrhyncha that have been found with *Z. pulchra*, although usually as singletons, include *Issus coleoptratus* (Fabr.), *Balclutha punctata* (Fabr.) (sometimes abundant), *Edwardsiana crataegi* (Douglas) and *Idiocerus ustulatus* (Mulsant & Rey). All of these species are presumably using yew as an overwintering refuge. When found on sycamore, it is usually among numerous aphids and psocids.

In Germany, *Z. pulchra* adults have been recorded throughout the year, but most frequently from late summer through to early spring (Nickel, 2003). Sycamore is regarded as the primary host, together with related *Acer* species, whilst conifers including spruce (*Picea* spp.) are used as overwintering hosts (Nickel, 2003; Biedermann & Niedringhaus, 2004). The records reported here suggest a similar pattern of host alternation by *Z. pulchra* between the primary host, sycamore, on which it breeds around early May, and various conifers and other evergreens to which it moves in October for overwintering. Probable nymphs of *Z. pulchra* have been seen only in September (J. Botting). The first adults were seen on evergreen hosts in mid-October. The adults return to sycamore only when foliage appears in April or May.

Nickel (2003) reports a suggestion that the species has recently undergone a north-eastward range expansion within Germany, primarily colonising urban habitats, but suggests that this apparent trend may simply be an artefact of increased collecting effort in such areas. The new UK records are also primarily in urban areas. This may also reflect collecting biases, but may also be related to the abundance of cultivated sycamores in close proximity to evergreens.

Since being first recorded in Britain in 2001, this species appears to have spread remarkably fast, although deliberate searching for the species in suitable locations has shown that it is not yet ubiquitous. One of us (JSB) recorded all insects beaten from yew in Perry Wood, East Kent fortnightly from 1984–1995. *Zyginella pulchra* was never recorded during this time period, but, as listed above, appeared for the first time at this site in 2008. We can therefore be reasonably confident that this species was not present in Britain before approximately 2000, but has since spread rapidly

several hundred kilometres both northwards and westwards. Given that most of the above records apply to specimens found on mature trees, it is perhaps reasonable to speculate that this spread has been achieved by flight dispersal, rather than through transportation of eggs laid in plants that have been imported or moved around the country for amenity plantings.

It may be significant that adults emerge only at the end of summer, and on sycamore – a tree which hosts fewer insects than native species. They move onto evergreens within weeks, and although they appear to prefer yew, are equally successful on ivy, Leyland cypress and other hosts. Dispersal seems to occur rapidly, avoiding the highest predator abundance during the summer. As collecting activity is greatest during summer, they have remained largely unobserved by entomologists during their steady spread since 2001. Further records from northern and western Britain will enable us to ascertain exactly how quickly this range expansion is taking place.

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SHORT COMMUNICATION

A second confirmed British record of *Brachymeria tibialis* (Hymenoptera: Chalcididae). – Richard Jones' recent article (Jones, 2008) establishing the occurrence of the chalcidid *Brachymeria tibialis* (Walker) as a British species was timely in helping to confirm the identity of a specimen taken on the border of West Kent and East Sussex. On 16 August 2008, I was recording at a flower-rich unimproved grassland site on thin sandy soil off Benhall Mill Road, Tunbridge Wells (TQ 593 380). The site is just on the Sussex side of the modern county boundary, and well within the Watsonian vice-county of East Sussex. On the edge of the field I noticed what appeared to be a small yellow and black aculeate wasp settled on the sunlit foliage of an oak sapling. On netting it, I was surprised to find that it was in fact a relatively large and striking chalcidid. Consultation of the Royal Entomological Society Handbook for this group (Ferrière & Kerrich, 1958) suggested that it was a doubtfully British species, there called *Brachymeria intermedia* (Nees). Richard Jones' article, with its fuller description, later served to confirm this provisional identification, as well as providing the current name for the species. The field where the specimen was found supports a population of a potential host species, the burnet moth *Zygaena filipendulae* (L.). Although now on the edge of the built-up area of Tunbridge Wells, bounded on two sides by houses and threatened with development, the site is an outlying fragment of the former Frant Forest, a once very extensive tract of heathland and grassland of which larger portions survive as nature reserves further south. – IAN C. BEAVIS, 104 St James' Road, Tunbridge Wells, Kent TN1 2HH.

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OBITUARY
THEODORE JAMES GRAHAM HOMER
1913–2008

Theo Homer passed away on 17th January, 2008, aged 94. He was born on 10th December, 1913, in Montreal, Canada, where his father was an engineer of some repute. Theo was born by Caesarian section, the first baby to be delivered by this method in Canada. Though he was fit and well, his mother was very ill after the birth and Theo was brought back to England by his grandmother.

Around this time the motor vehicle was becoming popular and possibilities for public transport opened up. A company called B.E.T. (British Electric Traction Co.) was set up and Theo's father was headhunted to run the company. Thus the family was reunited, the Company became the Thames Valley Traction Co. of Reading and Theo later continued with the Company in his father's footsteps.

Theo was educated at Wellington College and then Worcester College, Oxford, where he studied history, one of his many loves. He was a fine hockey player, representing his College and Berkshire. When age slowed him down he became an equally competent umpire. Another of his lifelong interests was the history of shipping, in particular, warships. He not only had a large library of books on the subject but had a good collection of self-made cased models of many of Britain's warships.

He became seriously interested in Lepidoptera in about 1950, when living at Hastings, Sussex. For the next decade he collected locally, especially in 'Bottle Alley', Hastings, where insects came to the lights which shone nightly in this 'trap' under the cliffs and where migrants were to be found.

Upon early retirement he moved to Henley-on-Thames where he purchased a bachelor flat at Phyllis Court. He joined the Society in 1956 and pursued his

entomology enthusiastically from then until the mid-1980s when shaky hands prevented him from setting insects. Not only did he travel extensively in England but became a World traveller, sometimes by conventional methods, but often on merchant vessels as one of a small number of passengers amongst the freight. He would stop at a port for several days, hire a taxi and scour the surrounding countryside for butterflies and moths. He had relations in Australia, Trinidad and South Africa and they enabled him to spend longer in those countries.

Though probably unknown to younger members of the Society he was a member of a group of fine entomologists amongst whom were Michael Tweedie, Brian Baker and Sir Robert Saundby. It was the trio of Michael Tweedie, Theo and myself which rediscovered the first two specimens of *Trisateles emortualis* (Olive Crescent) in the now well-known Gussetts Wood, Bucks. In July, 1962. Theo was also one of the last to take a specimen of *Cucullia gnaphalii* ssp. *occidentalis* (The Cudweed) in Beckley Woods, Sussex.

When his parents became elderly, Theo moved to the family house at Pinkneys Green, Maidenhead and here carried on his hobby, combining it with a passion for gardening. His large rockery was constructed over several years with large rocks retrieved while on collecting trips. The boot of his Riley 4/68 seldom returned without a rock, just moveable by two people, nestling amongst the mothing gear and the rotary converter which was a permanent fixture for running his mv light from the car battery.

Theo married late in life, to Joy, his first cousin and inherited two step-children at the same time. They lived happily at Pinkneys Green until a decision was made to downsize. They moved to a flat back at Phyllis Court a few years ago. Theo became too ill to be looked after at home and spent his last few months at Holyport Nursing Home in Berkshire.

TONY HARMAN

SHORT COMMUNICATIONS

***Metalimnus formosus* (Hemiptera: Cicadellidae) in Norfolk – the second British record after 101 years.** – A survey of the invertebrates of Norfolk fens was undertaken for the Broads Authority in 2007 and 2008 with the aim of correlating environmental variables with assemblages so that beneficial management practices could be deduced. I collected flies for this project using sweep-netting in 2007 and netting and suction sampling in 2008. A few hoppers were identified on a casual basis. Among them was the strikingly marked *Metalimnus formosus* (Boheman) collected at Strumpshaw Fen RSPB reserve in the floodplain of the River Yare. One male was swept from tall (2.5 m) dense reed mixed with other fenland plants (TG335067, 20 June 2007), and two males nearby at a small reed-choked ditch where sedges dominated the adjacent wet fenny field (TG336069, 19 July 2007). No adults were seen the following year but a nymph that is almost certainly this species was swept from the second of these sites (24 June 2008). Other uncommon hoppers collected at Strumpshaw Fen were the nationally scarce *Chloriona vasconica* Ribaut and *Cicadula flori* (J. Sahlberg). Adult *Metalimnus* were identified using Le Quesne (1969) and confirmed using Biedermann & Niedringhaus (2004), and the nymph was identified using Vilbaste (1982). This is the second British record. The previous one was made about 60 km from Strumpshaw Fen at Brandon, Suffolk, in August 1906,

where it was found in an osier carr on the River Little Ouse (Kirby, 1992).
C. MARTIN DRAKE, Orchid House, Burridge, Axminster, Devon EX13 7DF.

ACKNOWLEDGEMENTS

I thank Dr Mike Wilson for checking my determination of one male that is now in Cardiff Museum, and Dr Alan Stewart for identifying the immature specimen. I thank the RSPB for permission to survey their reserve. The Broads Authority and Natural England funded the project.

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Tarsonemid broad mites hitch-hiking on whitefly imported with vegetables from Nigeria. – The broad mite *Polyphagotarsonemus latus* (Banks) (Acari: Tarsonemidae) is a cosmopolitan (including the UK), polyphagous pest of a range of crops belonging to many plant families, including the Cucurbitaceae, Malvaceae, Rutaceae and Solanaceae. Phoresy by the broad mite on whiteflies (including species assigned to the genera *Aleyrodes*, *Bemisia*, *Dialeurodes* and *Trialeurodes*) has been widely

Fig. 1. Adult female broad mites attached to the tarsi and tibia of an adult female tobacco whitefly.

documented (Natarajan, 1988; Parker & Gerson, 1994; Fan & Petitt, 1998; Flechtmann *et al.*, 1990; Palevsky *et al.*, 2001; Bautista, Arnal & Aponte, 2005). The Central Science Laboratory received a sample of tossa jute *Corchorus olitorius* foliage (Tiliaceae) imported from Nigeria into Heathrow Airport, London, on the 16th March 2006, infested with broad mites and tobacco whitefly *Bemisia tabaci* (Gennadius). One newly emerged adult female *B. tabaci* was found to have seven adult female *P. latus* attached to her tarsi and tibia (Fig. 1). Broad mite and tobacco whitefly are regularly transported accidentally with international plant trade (CSL unpublished interception records) and the adult whitefly may play an important role in broad mite dispersal once it arrives at its destination. Thus non-European populations of the mite could be introduced into Europe with trade and be rapidly dispersed by whitefly. – CHRIS MALUMPHY, Central Science Laboratory, Sand Hutton, YO41 1LZ, U.K.

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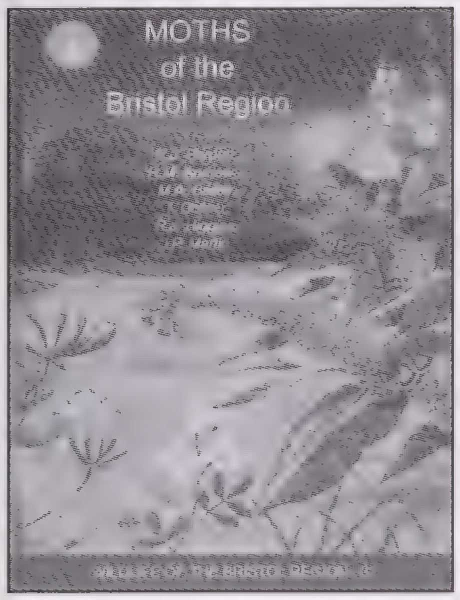
BOOK REVIEW



Moths of the Bristol Region by R. J. Barnett, R. M. Andrews, M. A. Bailey, T. Corner, R. J. Higgins & J. P. Martin (Bristol Regional Environmental Centre, 2008). 526pp. £29.95 excluding postage (hardback). ISBN 978-0-9545235-1-0.

This is Volume 3 of a series but the reviewer has not seen the earlier ones (*Flora*, 2000 and *Butterflies*, 2003). How much the format owes to its predecessors is unknown but this is an impressive work. It covers the period 1990–2006, but with the occasional excursion into 2007 where some significant event needs reporting to provide context. The area covered is the old County of Avon prior to its abolition

in 1997. This means it does not exactly correspond to a Vice County(ies) but covers VC34 plus bits of VC6 and VC7. This could have been made clearer.

The introductory matter includes chapters on Habitats; Moth studies; Moth hunting, then and now; and Conserving our moth species. The moth studies comprise a treatise on the Avon Gorge, the main local "hot-spot", treating either side as separate entities; the personal experiences at four garden sites; and the autecology of the Twin-spotted Wainscot. For me this last was a most fascinating account.

The main part of any area moth list is the species accounts. The text is brief and concise for the most part but with more detail in a few selected cases, e.g. the local rarity, Silky Wave. The scarcity aspect is dealt with in a regularised way at the beginning of the book. Historical perspective is given by selectively quoting earlier authors (the VCHs, etc.) for each species. Some, usually rather nice, photographs are included including five showing leaf mines (*Eriocrania salopiella* (Stainton) [0010], *Ectoedemia rubivora* (Wocke) [0031], *Stigmella hemargyrella* (Kollar) [0081], *Antispila treitschkiella* [0159] and *Bedellia somnulentella* (Zeller) [0264]) and even genitalia preparations (*Grapholita lobarzewskii* (Nowicki) [1249] and Pauper Pug [1824]).

The norm in such works is to use tetrad maps but, refreshingly, the authors have opted to use the 1 km square level. This gives more detail on locations and does not detract from the overall impression of the pattern of distribution. It would be possible to mention a few minor anomalies, for instance the text on *Stigmella aurella* (Fabr.) [0050] states that there are records from 41 squares but the map shows only 18 of them, but this would be cavil. Each distribution map is accompanied by a bar chart showing flight times. This obviates any need to spell out dates, voltinism, etc. and is very useful. Other plotting regimes can show more detail but only at the expense of using more space. The authors have used additional graphs where they show build up in numbers (e.g. Straw Dot *Rivula sericealis* (Scopoli) [2474], annual fluctuations (Diamond-back Moth *Plutella xylostella* (L.) [0464]), etc. Distribution maps are not, however, given for the micro-moths, except the more common species and the pyralids. The reason given is that the paucity of records would not truly reflect the distribution of the taxa, which seems normal for most areas in Britain at present.

Orange Footman is shown to be flying for longer than stated in current identification books whereas Least Carpet has only just arrived. There are a number of species that have not been recorded during the survey period and a symbol highlighting these potentially extinct or missing species would have been helpful for readers.

As usual, this region is crying out for some more fieldwork, particularly for micro moths and perhaps the Record Centre would consider placing maps and site specific data on the website to encourage visiting entomologists to help find species of concern. A table of all sites mentioned in the species accounts is provided including a grid reference.

All in all, a very user-friendly work that is a treat to dip into. The text conveys the enthusiasm and there is no hint of arrogance on the part of the authors and one is left keen for a little more. Moth enthusiasts will enjoy comparing their experiences with the species accounts. The variation in page layout with text liberally interspersed with charts, photographs and drawings is visually appealing. The authors should be congratulated – an inspiration.

DAVID C. GARDNER

THE MAITLAND EMMET BENHS RESEARCH FUND

In 2001 the family of the late Lt. Col. Maitland Emmet, a distinguished amateur microlepidopterist, made a generous donation to the Society's Research Fund in his memory. As a result the Society has renamed its Research Fund the Maitland Emmet BENHS Research Fund. The Society is very grateful to the Emmet family for their generosity.

The Society invites applications for grants, from the Maitland Emmet Research Fund, to be awarded in December 2009. Awards are open to both members and non-members of the BENHS and will be made to support research on non-marine arthropods, with reference to the British fauna, and with preference given to insects, arachnids, myriapods and isopods. Grants will be given for:

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Cover photograph: Dusky Yellowstreak mayfly, *Electrogena lateralis* (Curtis) (Heptageniidae). River Ayr, Ayrshire, May 2006. (Photo: Craig Macadam).

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THE WOOD-DECAY INVERTEBRATES OF THE LANHYDROCK ESTATE, EAST CORNWALL: A SITE OF HIGH NATURE CONSERVATION VALUE BUT WITH NO LEGAL PROTECTION

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ABSTRACT

The Lanhydrock Estate lies within Cornwall's richest area for wood-decay invertebrates – the lower Fowey catchment. It is shown to be of significant nature conservation interest at possibly national level, and certainly regional and county levels. Details are provided of the wood-decay beetles, flies and other invertebrates recorded during the past 20 years. The linkages with site management history and the wider landscape are also explored. It is recommended that the site requires a formal national designation of its high nature conservation values.

INTRODUCTION

The author has been interested in the invertebrate fauna of the Lanhydrock Park area since first visiting the estate in August, 1979. Harding (1978) had just included the parkland in the national inventory of sites of potential importance for the specialist fauna of the 'Mature Timber Habitat', i.e. species dependent on decaying wood in sites with a long history of large old trees. This habitat type would now be referred to as 'old growth' (Alexander *et al.*, 2003) and is covered by the Wood Pasture and Parklands Habitat Action Plan – a Priority Habitat under the UK Government's Biodiversity Action Plan.

Investigating wood-decay fauna demands specialist knowledge, and this is especially the case in sites which have been maintained in a 'tidy' condition for extended periods, i.e. they have been damaged by removal of fallen deadwood as well as any dying – or even ageing trees. With hindsight, it is no surprise that it was not possible to locate any interesting invertebrates at the time of that first visit. Over time, however, that knowledge has slowly been built up and site management has changed to some extent so that – 30 years on – it is now possible to report on the Lanhydrock Park Estate's notable wood-decay invertebrate fauna.

For the purposes of this article the new revised definition of saproxylic organisms will be used (Alexander, 2008c) – species which are involved in or dependent on the process of fungal decay of wood, or on the products of that decay, and which are associated with living as well as dead trees. Conventionally two further groupings of organisms are included within the scope of the definition: (i) sap-run associates, and (ii) organisms other than fungi that feed directly on the wood. Insects developing in the fruiting bodies of gill fungi are a particular problem as many do not confine themselves to wood-decaying fungi – for these insects, the principle is adopted to include those species for which wood-decay fungi appear to be a major larval resource.

HISTORICAL ECOLOGY OF THE AREA

The Lanhydrock Park Estate lies across the lower valley of the Fowey River close to Bodmin in East Cornwall. This section of the Fowey valley includes a concentration of historic parklands, with the former medieval deer park of Restormel Castle immediately to the south, the landscape park of Glynn and another former deer park (Pinsla) immediately to the north-east, plus Boconnoc

Park SSSI and Ethy Park along the tributary valley of the River Lerryn. These sites are all linked by a network of ancient woodlands and wood pasture trees along the valley, and including Cabilla and Redrice Woods, a nature reserve of the Cornwall Wildlife Trust. Not surprisingly the area is the richest part of Cornwall for wood-decay (saproxylic) invertebrates (Alexander, 1993).

Lanhydrock Park itself (SX090636) was enclosed during the early 17th Century as part of the landscaping for the newly built mansion. The land had previously been part of a farm owned by St Petroc's Priory, Bodmin (suppressed by Henry VIII) and still has signs of the former strip field cultivation of that time. The deer park was later developed into the current, more formal, landscaped park in the 18th Century.

The lower-lying land along the Fowey appears to have been used as wood pasture, variously affected by tin-streaming, and still retains many large old trees – now mostly engulfed within secondary woodland. Higginsmoor Wood (SX096630) is the largest expanse of such woodland but other areas survive on the opposite bank of the river. Grazed wood pasture still exists immediately above Respryn Bridge (SX099635).

Invertebrate recording and site condition

The earliest known records of interesting wood-decay beetles from the estate arose from the National Trust Biological Survey in 1989, when *Abraeus perpusillus* (Marsham) (Histeridae) was found within Lanhydrock Park itself and *Calambus bipustulatus* (L.) (Elateridae) associated with veteran oaks along the river Fowey below. The *Abraeus* featured on the beetle list in the *Victoria County History* (Clark, 1906) but had not been reported in the county since then, and *Calambus* was previously unknown in the county. There followed a few occasional records of local interest. *Xyleborus saxeseni* (Ratzeburg) was a significant find in 1993, as this was a considerable extension to its known range in England (Alexander, 1994). But, overall, the beetle fauna still did not seem impressive and was assessed as no more than county interest. However, conservation of old trees and deadwood in the parkland and elsewhere on the estate had been notably poor around this time.

Since the 1989 biological survey there has been a significant improvement in conservation management on the estate, with the park pastures being converted to an organic regime and fallen deadwood being retained in some areas of the parkland, as well as ageing trees being afforded more respect (Figs. 1 & 2). This more relaxed and wildlife-friendly land management enabled many previously overlooked species to be detected. The Nationally Scarce *Aplocnemis nigricornis* (Fabr.) (Melyridae) and *Phloiophilus edwardsi* Stephens (Phloiophilidae) were added to the county list (Alexander, 2005a & b) and it soon became clear that the site does have considerable potential for interesting wood-decay beetles.

A contract survey, up-dating the 1989 biological survey, provided an opportunity for more intensive investigation of the fauna during 2008. Particular emphasis was placed on searching for specialist wood-decay invertebrates across the estate and the hand-searching work was supplemented by the operation of two flight interception traps placed within the parkland. One trap was hung against the trunk of a large old open-grown oak within the open parkland, the other hung from a recently collapsed veteran sycamore within the park edge. These trees were selected partly as the traps would be relatively inaccessible to vandalism and partly because the trees themselves held important wood-decay habitat. A major bough had ripped out from the oak and lay in-situ beneath, leaving a large scar of exposed wood on the trunk. Oyster mushroom *Pleurotus* sp. was fruiting in profusion from the collapsed sycamore trunk and the shattered base also held *Ganoderma australe* bracket fungi.

Fig. 1. An old open-grown wood-pasture oak engulfed in secondary woodland along the Fowey floodplain.

Fig. 2. An old oak along the Fowey riverside showing red-rotten heartwood exposed by a chainsaw cut.

All Diptera from the flight traps were identified by Peter Chandler, while the other material was identified by the author.

The beetle fauna

Following the 2008 investigation, 77 species of wood-decay beetles are now known from the Estate – 11% of the total British fauna (Alexander, 2002). This is a substantial increase and it seems likely that many more await discovery. Fourteen of these have Nationally Scarce status and a further two species have British Red Data Book (RDB) status (Hyman & Parsons, 1992). The two RDB species are *Agathidium confusum* Brisout (Leiodidae) and *Mordellistena neuwaldeggiana* (Panzer) (Mordellidae), and both species had not previously been known from the county. Both were taken by the flight traps, the *Agathidium* in the sycamore trap, the *Mordellistena* in the oak trap. Of the 14 Nationally Scarce species five had not previously been known from the county: *Microscydmus nanus* (Schaum) (Scydmaenidae), *Prionocyphon serricornis* (Müller) (Scirtidae), *Enicmus brevicornis* (Mannerheim), *E. fungicola* Thomson and *E. rugosus* (Herbst) (Latridiidae), while *Mycetophagus piceus* (Fabr.) (Mycetophagidae) had not been reported since the Victoria County History list was published (Clark, 1906). Indeed, Lanhydrock is currently the only known Cornish site for a total of 14 species, the only site with modern records for a further seven species, and a further nine species have only been reported from one other site in the county. This surely makes Lanhydrock pre-eminent in Cornwall for wood-decay beetles – based on current knowledge. The full list is presented in Table 1.

An interesting aspect of the beetle fauna is the representation of heart-rot species – an assemblage which requires trees to attain old age and for the heartwood to have been decayed by specialist fungi. Key species in this respect are: *Mycetophagus piceus* (Mycetophagidae), which develops in the fungal mycelium of *Laetiporus sulphureus*, *Dorcatoma chrysomelina* (Anobiidae) which develops in the red-rotten heartwood itself, and *Xestobium rufovillosum* (Anobiidae), which bores in the heartwood in the early stages of fungal decay. This assemblage is unknown elsewhere in Cornwall.

Of the 77 species recorded, 69 were used in the calculation of the Site Quality Index (SQI; Fowles, Alexander & Key, 1999), which reached 361. Although not coming close to the 500 threshold suggested for national importance (Fowles, Alexander & Key, 1999), this was comparable with SQI values for sites such as Bradgate Park SSSI, Attingham Park SSSI and Dinefwr Park SSSI – sites considered by the Government nature conservation agencies to be nationally important for saproxylic invertebrates. The new species list also produces an Index of Ecological Continuity (IEC; Alexander, 2004) of 22, which is much closer to the 25 threshold for national importance for that Index. Given that 22 is so close to 25, and that so many important discoveries were made during 2008, it seems reasonable to suggest that national significance is readily achievable for the IEC with further recording effort.

Very few wood-decay beetles known from Cornwall are not yet known from Lanhydrock and most of these have been found in the other local sites along the lower Fowey valley, suggesting that they might have been overlooked at Lanhydrock. The most interesting is the British Red Data Book species *Hypulus quercinus* (Quensel) (Melandryidae), known from Cabilla and Penrice Woods (McClenaghan, in prep). *Mycetophagus quadriguttatus* PWJ Müller (Mycetophagidae) and *Leptura aurulenta* (Fabr.) (Cerambycidae) have been found in Boconnoc Park, *Microrhagus pygmaeus* (Fabr.) (Eucnemidae), *Thanasimus formicarius* (L.) (Cleridae), *Biphyllus lunatus* (Fabr.) (Biphyllidae) and *Conopalpus testaceus* (Olivier)

Table 1 Wood-decay beetles known from the Lanhydrock Park Estate

Family & Species[1]	Year	SQI[2] scores	IEC[2] scores	GB Status	Cornwall Status
Histeridae					
Abraeus perpusillus (Marsham)	1989	4	0		Only modern site
Leiodidae					
Agathidium confusum Brisout	2008	24	0	RDBI	Only known record
Agathidium nigripenne (Fabr.)	2008	2	0		
Scydmaenidae					
Microscydmus nanus (Schaum)	2008	0	2	NS[3]	Only known record
Staphylinidae					
Phloeonomus punctipennis CG Thomson	2008	2	0		
Phyllodrepa devillei (Bernhauer)	2008	2	0		?
Bibloporus bicolor (Denny)	2008	2	0		Only known record
Siagonium quadricorne W Kirby	2008	2	0		
Gabrius splendidulus (Gravenhorst)	2008	1	0		Only modern site
Atrecus affinis (Paykull)	2008	1	0		
Lucanidae					
Dorcus parallelepipedus (L.)	2008	2	0		
Sinodendron cylindricum (L.)	2008	2	0		
Scirtidae					
Prionocyphon serricornis (Müller)	2008	8	1	NS	Only known record
Eucnemidae					
Epiphanis cornutus Eschscholtz	2008	8	0		Only known record
Melasis buprestoides (L.)	2008	4	1	NS	One of 2 known sites
Elateridae					
Calambus bipustulatus (L.)	1989	8	1	NS	One of 2 known sites
Denticollis linearis (L.)	2008	1	0		
Melanotus castanipes (Paykull)	2008	1	0		
Cantharidae					
Malthodes guttifer Kiesenwetter	2008	8	0	NS	
Malthodes marginatus (Latreille)	2008	1	0		
Anobiidae					
Anobium punctatum (Degeer)	2008	1	0		
Dorcatoma chrysomelina Sturm	2008	4	0		Only known record
Grynobius planus (Fabr.)	2008	2	0		
Ptilinus pectinicornis (L.)	2008	1	0		
Xestobium rufovillosum (Degeer)	2008	4	1		Only native site
Phloiophilidae					
Phloiophilus edwardsi Stephens	2008	8	1	NS	One of 2 known sites
Trogossitidae					
Thymalus limbatus (Fabr.)	2008	8	2	NS	One of 2 known sites
Melyridae					
Aplocnemis nigricornis (Fabr.)	2003	16	2	NS	One of 2 known sites
Sphindidae					
Aspidiphorus orbiculatus (Gyllenhal)	2008	2	0		
Epuraea biguttata (Thunberg)	2008	2	0		
Monotomidae					
Rhizophagus bipustulatus (Fabr.)	2008	1	0		
Rhizophagus dispar (Paykull)	2008	1	0		
Rhizophagus nitidulus (Fabr.)	2008	4	1	NS	One of 2 known sites
Rhizophagus perforatus Erichson	2008	2	0		Only modern site
Cucujidae					
Pediacus dermestoides (Fabr.)	2008	4	1		
Laemophloidae					
Cryptolestes ferrugineus (Stephens)	1989	2	0		One of 2 known sites
Cryptophagidae					
Cryptophagus dentatus (Herbst)	2008	1	0		
Henoticus serratus (Gyllenhal)	2008	0	0		?
Erotylidae					
Triplax aenea (Schaller)	2008	2	0		

Table 1 *(continued)*

Family & Species[1]	Year	SQI[2] scores	IEC[2] scores	GB Status	Cornwall Status
Cerylonidae					
Cerylon ferrugineum Stephens	1993	2	0		
Endomychidae					
Endomychus coccineus (L.)	2008	2	0		
Latridiidae					
Enicmus brevicornis (Mannerheim)	2008	8	1	NS	Only known record
Enicmus fungicola Thomson	2008	8	0	NS	Only known record
Enicmus rugosus (Herbst)	2008	8	2	NS	Only known record
Enicmus testaceus (Stephens)	2008	2	0		Only known record
Mycetophagidae					
Litargus connexus (Fourcroy)	2008	2	0		Only modern site
Mycetophagus atomarius (Fabr.)	1995	2	1		One of 2 known sites
Mycetophagus piceus (Fabr.)	2008	4	2	NS	Only modern site
Ciidae					
Orthocis alni (Gyllenhal)	2008	2	0		
Cis bilamellatus Wood	2004	0	0		
Cis boleti (Scopoli)	2008	1	0		
Cis hispidus (Paykull)	1989	4	0		Only modern site
Cis vestitus Mellié	2008	2	0		Only known record
Melandryidae					
Melandrya caraboides (L.)	2008	4	1	NS	One of 2 known sites
Mordellidae					
Mordellistena neuwaldeggiana (Panzer)	2008	16	0	RDBK	Only known record
Tenebrionidae					
Nalassus laevioctostriatus (Goeze)	2008	0	0		
Salpingidae					
Rhinosimus planirostris (Fabr.)	2008	1	0		
Rhinosimus ruficollis (L.)	2008	1	0		Only known record
Scraptiidae					
Anaspis costai Emery	2003	2	0		
Anaspis frontalis (L.)	2008	1	0		
Anaspis garneysi Fowler	2008	0	0		
Anaspis lurida Stephens	2008	2	0		
Anaspis maculata Geoffroy	2008	0	0		
Anaspis pulicaria A Costa	2008	1	0		
Anaspis regimbarti Schilsky	2008	0	0		
Anaspis rufilabris (Gyllenhal)	2008	1	0		
Cerambycidae					
Grammoptera ruficornis (Fabr.)	2003	1	0		
Rhagium mordax (Degeer)	1989	1	0		
Rutpela maculata (Poda)	2008	1	0		
Leiopus nebulosus (L.)	2008	2	0		
Curculionidae					
Euophryum confine (Broun)	2008	0	0		
Scolytinae					
Hylesinus crenatus (Fabr.)	2008	2	0		Only modern site
Scolytus intricatus (Ratzeburg)	2008	2	0		
Scolytus scolytus Fabr.)	1979	2	0		
Dryocoetinus villosus (Fabr.)	2008	2	0		
Trypodendron signatum (Fabr.)	2008	8	1		Very few records
Xyleborinus saxeseni (Ratzeburg)	1993	4	1		Only known record
	SQS[2]	**249**	**22**	**IEC**	
	SPP[2]	**69**			
	SQI	**361**			

[1] In taxonomic order with date of the most recent record.
[2] SQI Site Quality Index (see text); SQS Site Quality Score, ie the sum of the individual species scores; SPP the total number of qualifying species. IEC Index of Ecological Continuity (see text).
[3] NS: Nationally Scarce (see Hyman & Parsons, 1992).

at Ethy Park (Melandryidae), *Aderus oculatus* (Paykull) (Aderidae) at Doublebois, and *Orchesia undulata* Kraatz (Melandryidae) at both Boconnoc and Ethy. The presence of these would boost the IEC of Lanhydrock well into the nationally important category and illustrates the importance of the lower Fowey landscape for wood decay fauna. Perhaps this illustrates the advantages of evaluation at a landscape scale rather than a scale based on sites defined by land ownership. The same thresholds are habitually applied to both large landscape scale areas (such as Windsor Forest and the New Forest and also more discrete sites such as Bradgate Park, which is part of the larger Charnwood Forest.

The fly fauna

The wood-decay fly fauna of Lanhydrock was barely known at all before 2008. Ian McLean had visited the Maudlin Valley area on the south side of the estate during the 1983 field meeting of the Diptera Recording Schemes, and had found two Nationally Scarce fungus gnats *Mycetophila lastovkai* Caspers and *Syntemna nitidula* Edwards (Mycetophilidae; Falk & Chandler, 2005) as well as other Diptera. *M. lastovkai* is a speciality of south west Britain but is known from no other Cornish site (P.J. Chandler, pers. comm.). *Syntemna nitidula* has a much wider range in Britain but, again, this is the only known Cornish record. The uncommon awl fly *Xylophagus ater* Meigen (Xylophagidae) was noted by the author in Great Wood in 1986, and *Xylota sylvarum* (L.) (Syrphidae) was noted in the park during the 1989 National Trust Biological Survey. The list now stands at 75 species however (see Table 2) – just over 10% of the total British wood-decay fly fauna (Alexander, 2002). Some of the Mycetophilidae included in the species totals for wood-decay are known to use a wider range of fungi for breeding, but appear to be strongly dependent on wood-decay species in particular – these are indicated in Table 2 with an asterisk. Some of the other Diptera are also of unconfirmed biology but are thought most likely to be saproxylic.

The present list is most notable for the pre-eminence of fungus gnats, with 24 saproxylic species taken by the two flight traps operated across the 2008 summer – about 16% of the British wood-decay species. These include three further notable rarities: *Ectrepesthoneura colyeri* Chandler LR (NS), *Manota unifurcata* Lundstroem LR(NT) and *Brachypeza armata* Winnertz LR(NS) (see Table 2 for explanation of species status). None of these species has previously been reported in Cornwall (Falk & Chandler, 2005). The *Brachypeza* was taken by the sycamore trap while the other two were found in the oak trap. *Brachypeza armata* is known to have a particular association with oyster mushrooms *Pleurotus* spp. in continental Europe which probably explains its presence around the collapsed sycamore. It is interesting that the other two were taken on a large isolated open-grown tree within the core of the parkland. Falk & Chandler (2005) describe the habitat of these species as 'broad-leaved woodland' but this is clearly inaccurate. Their presence in Lanhydrock Park suggests that it is a history of large old trees with decaying wood that is the important factor. Open-grown trees are much more likely to reach old age than close-grown trees, and will therefore provide better quality decaying wood habitats and for a longer period.

Manota unifurcata appears to be the rarest of all the wood-decay invertebrates known from Lanhydrock, with just 11 British localities detailed in Falk & Chandler (2005). These include many of the classic old growth sites of the New Forest, Epping, Windsor, and Wychwood Forests, and Burnham Beeches. The nearest known sites to Lanhydrock are over 150km away.

It is unfortunate that no site quality indices have so far been developed for assessing the nature conservation importance of sites for wood-decay flies, and so it

Table 2 Wood-decay flies known from the Lanhydrock Park Estate[1]

Family & Species	Year	Family & Species	Year
Pediciidae		**Psychodidae**	
Ula mollissima Haliday	2008	*Telmatoscopus rothschildii* Eaton	2008
Limoniidae		**Anisopodidae**	
Austrolimnophila ochracea (Meigen)	1983	*Sylvicola cinctus* (Fabr.)	2008
Epiphragma ocellare (L.)	2008	**Xylophagidae**	
Neolimonia dumetorum (Meigen)	2008	*Xylophagus ater* Meigen	1986 & 2008
Ditomyiidae		**Stratiomyidae**	
Symmerus annulatus (Meigen)	2008	*Pachygaster leachii* Stephens	2008
Keroplatidae		**Hybotidae**	2008
Cerotelion striatum (Gmelin)	2008	*Tachypeza nubila* (Meigen)	2008
Macrorrhyncha flava Winnertz	2008	**Dolichopodidae**	
Orfelia fasciata (Meigen)	2008	*Medetera dendrobaena* Kowarz	2008
Orfelia unicolor (Staeger)	2008	*Medetera impigra* Collin	2008
Macrocera anglica Edwards	1983	*Medetera inspissata* Collin	2008
Macrocera angulata Meigen	1983	*Medetera jugalis* Collin	2008
Macrocera stigma Curtis	2008	*Medetera muralis* Meigen	2008
Mycetophilidae		*Medetera truncorum* Meigen	2008
Apolephthisa subincana (Curtis)	2008	*Sciapus platypterus* (Fabr.)	2008
Coelosia tenella (Zetterstedt)	2008	**Syrphidae**	
Ectrepesthoneura colyeri Chandler **NS**	2008	*Chalcosyrphus nemorum* (Fabr.)	2008
Ectrepesthoneura hirta (Winnertz)	2008	*Myathropa florea* (L.)	2008
Saigusaia flaviventris (Strobl)	2008	*Xylota sylvarum* (L.)	1989
Syntemna nitidula Edwards **NS**	1983 & 2008	**Clusiidae**	
Tetragoneura sylvatica (Curtis)	2008	*Clusia flava* (Meigen)	2008
Rondaniella dimidiata (Meigen)*	2008	*Clusiodes albimanus* (Meigen)	2008
Manota unifurcata Lundström **NT** [2]	2008	*Clusiodes gentilis* (Collin)	2008
Brachypeza armata Winnertz* **NS**	2008	**Acartophthalmidae**	
Exechia bicincta (Staeger)*	2008	*Acartophthalmus nigrinus* (Zetterstedt)	2008
Exechia fusca (Meigen)*	2008	**Odiniidae**	
Mycetophila fraterna Winnertz	1983	*Odinia boletina* (Zetterstedt)	2008
Mycetophila lastovkai Caspers **NS**	1983	**Asteiidae**	
MYcetophila ocellus Walker*	1983	*Leiomyza scatophagina* ((Fallén)	2008
Mycetophila ornata Stephens	1983 & 2008	**Heleomyzidae**	
Mycetophila tridentata Lundström	2008	*Suillia variegata* (Loew)	2008
Mycetophila trinotata Staeger	1983 & 2008	**Drosophilidae**	
Mycetophila vittipes Zetterstedt	1983	*Drosophila phalerata* Meigen	2008
Phronia conformis (Walker)	1983	*Hirtodrosophila cameraria* (Haliday)	2008
Phronia humeralis Winnertz	1983	*Hirtodrosophila confusa* (Staeger)	2008
*Platurocypta testata (*Edwards)	1983	**Muscidae**	
Synplasta gracilis (Winnertz)	2008	*Phaonia pallida* (Fabr.)	2008
Trichonta melanura (Staeger)	1983	*Phaonia palpata* (Stein)	2008
Neoempheria pictipennis (Haliday)	1983	*Phaonia rufiventris* (Scopoli)	2008
Acnemia nitidicollis (Meigen)	2008	*Phaonia subventa* (Harris)	2008
Allocotocera pulchella (Curtis)	1983		
Monoclona rufilatera (Walker)	2008		
Polylepta guttiventris (Zetterstedt)	1983 & 2008		
Sciaridae			
Leptosciarella rejecta (Winnertz)	2008		
Leptosciarella trochanterata (Zetterstedt)	2008		
Lycoriella ingenua (Dufour)	2008		
Scythropochroa radialis Lengersdorf	2008		
Zygoneura sciarina Meigen	2008		

[1] In taxonomic order with dates of all records.

[2] LR(NT) and LR(NS) Lower Risk (Near Threatened) and Nationally Scarce: national conservation statuses, part of the IUCN Red List approach, a modified version of which has recently been adopted in Britain (see Falk & Chandler, 2005).

is difficult to assess the nature conservation significance of the Lanhydrock list. Indeed, specialist lists of wood-decay flies have rarely been published for other sites, and no other comparable sites in Cornwall have been investigated. With five national rarities, however, it seems reasonable to suggest at least county importance, even regional SW England importance.

The one comparable study that I am aware of is a survey of Chigwell Row Wood LNR, Hainault Forest, Essex (Schulten & Ismay, 2002). Three aerial vane traps were operated here during the May/June and September/October periods, and so the methodology is similar to that used during the Lanhydrock survey. Unfortunately the trapping data are amalgamated with other data in the report, but the fungus gnats in the traps were identified by P. J. Chandler and so a separate list is available for analysis. The traps yielded a total of 47 saproxylic fungus gnats of which four have Nationally Scarce status. The Lanhydrock list of 24 species is much lower, but the count of two Nationally Scarce and one Near Threatened species is much closer to the Chigwell Row Wood in quality. This suggests that the quality of the Lanhydrock Park fungus gnat fauna compares well with at least one exceptionally rich site in south east England.

Other invertebrate groups

The larva of a snake fly (Raphidioptera) has been found in the wood pasture north of Respryn Bridge but no adult has yet been found to identify the species. *Atlantoraphidia maculicollis* (Stephens) has recently been added to the Cornwall list from the Valency valley in the north (Alexander, 2008a) but *Phaeostigma notata* (Fabr.) is included in the Victoria County History list (Clark, 1906). It remains to be seen which species is present at Lanhydrock.

Amongst the bugs *Xylocoris cursitans* (Fallén) (Anthocoridae) and *Aradus depressus* (Fabr.) (Aradidae) were noted in 2008. Both appear to be of very restricted occurrence in the county, with the former a particular feature of the lower Fowey valley (Alexander, 2008b).

Aculeate wasps appear to be relatively poorly recorded from Lanhydrock, with only the very widespread *Pemphredon lugubris* (Fabr.) (Sphecidae) and hornet *Vespa crabro* L. (Vespidae) noted in 2008. No other records have been found.

No information is available on wood-decay moths or thrips, and the Hymenoptera Parasitica have not been investigated. No false scorpions have been found either, although *Lamprochernes chyzeri* (Tomosvary) has been found by the author in nearby Boconnoc Park and may well also be present at Lanhydrock.

Conclusions and final comments

It is clear from the above that the Lanhydrock Park Estate supports a notable fauna of wood-decay dependent invertebrates. The nature conservation assessments indicate at least Regional (SW England) site quality for wood-decay assemblages, while the beetle fauna alone could readily achieve national significance with a little more investigation. The park itself is already recognised by the local team of Natural England as being of SSSI quality for its epiphytic lichens, but designation has not been seen as a priority as the estate is owned by the National Trust. A more formal approach to nature conservation would appear sensible in order to better ensure the long-term survival of its nature conservation values.

Hopefully this review of current knowledge will encourage further investigation of this very interesting and important site, as well as stimulate recording work within the wider landscape.

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BIVOLTINE BLUES: A SECOND GENERATION IN THE BRITISH CHALKHILL BLUE *POLYOMMATUS CORIDON* (LEPIDOPTERA: LYCAENIDAE)

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We wish to report a very unusual case of bivoltinism in the British population of the Chalkhill Blue, *Polyommatus coridon* (Poda) (Lepidoptera: Lycaenidae). *Polyommatus coridon* is the second largest of the British Blues, with a wingspan of up to 40 mm, and the adults fly for 6–8 weeks between mid-July and mid-September. The species is locally common in southern England on south-facing chalk downland, and widespread in continental Europe. The distribution of this species is largely determined by the distribution of the larval foodplant, *Hippocrepis comosa* L. (Tolman & Lewington, 2008).

Unlike several other Blues, which are facultatively multivoltine, *P. coridon* appears to be strictly univoltine across its entire range, with a possible exception in Slovakia where the species *Polyommatus slovacus* (Vit'az *et al.*) occurs. This was originally described as a separate species, but recent genetic studies have suggested that it is a local bivoltine population of *P. coridon* (Schmitt, Varga & Seitz, 2005). In comparison, even at the northern extent of their European ranges (namely, the UK), the congenerics of *P. coridon, P. bellargus* (Rottemburg) and *P. icarus* (Rottemburg) are bivoltine. Indeed, *P. icarus* is known to be facultatively trivoltine in particularly warm autumns (Tolman & Lewington, 2008). The British subspecies (*P. coridon coridon*) is reported to overwinter as a second instar larva in Greece (Tolman & Lewington, 2008), and autumnal hatching at a low frequency has been recorded in captivity in the UK, producing overwintering larvae (Collier, 1956; Fearnehough, 1957)

Adult *P. coridon* were collected from two sites in southern England between 29 July and 14 August 2008 as part of a project investigating the incidence of parasitoids and pathogens in a range of butterfly species and habitats with differing degrees of fragmentation and isolation. Eight females were caught: one from Malling Down in East Sussex (TQ430107), and seven from Magdalen Hill Down in Hampshire (SU506293). Field-collected females were stored individually in small round plastic pots (52 mm diameter × 25 mm height) in a fridge at 4°C overnight and placed on potted *H. comosa* the following day. Although it was highly probable that females had mated prior to collection, one male, from the same site, was placed with each female. The butterflies were then enclosed on the plants using a 300 mm × 450 mm perforated plastic sleeve (sold as bread bags, http://www.cater4you.co.uk/acatalog/Perforated-Polypropylene-Bags.html). The plants were in flower, but each pot was additionally provisioned with a pad (50 mm wide × 60 mm long × 20 mm high) of tissue paper soaked with a 1:10 mixture of honey and water which was replaced every three days. The butterflies were maintained in this way in a well-ventilated glasshouse under natural light conditions at approximately 2°C above the ambient summer temperatures (approximately 21°C daytime temperature) at the NERC Centre for Ecology and Hydrology, Monks Wood, Cambridgeshire. Incidentally, these conditions were concurrently suitable for *P. icarus* to successfully produce a third generation. The aim of captive breeding in this case was to investigate any vertical

(within-ovum) transmission of pathogens from adults to offspring, and to provide sufficient quantities of captive-bred larvae for experimentation with pathogens the following spring.

No matings were observed in captivity, although this method has previously proved suitable for *P. bellargus* (R. Comont, *pers. comm.*) but each female began ovipositing between 1 and 7 days after introduction to the plants, for a duration of 1 to 21 days, each female laying 17–100+ ova. Ova took between 12 and 35 days to hatch, with eggs laid earlier in August taking longer to hatch than those laid in late August/early September. This resulted in all larvae eclosing over a 13-day period, all eight batches commencing eclosion in a 10-day period from the 1–10 September 2008. No remaining unhatched eggs could be found after the 1st October.

The larvae hatched in a fashion common to species which overwinter as ova and consequently have toughened cuticles, namely gnawing a circular opening centred on the micropyle just large enough for the larval head capsule to fit through, indicating that there was no obvious change in ovum morphology or larval eclosion technique which could be an adaptation to autumnal hatching rather than overwintering. It is interesting to note that the hole was slightly larger and more ragged than might have been expected from observations of related species which characteristically overwinter as ova, such as the Purple Hairstreak, *Neozephyrus quercus* (L.) (Lepidoptera: Lycaenidae) (J. Thomas, *pers. comm*).

A subset (*ca.* 30) of the larvae were left undisturbed on the plants, except to be moved to a new plant when they were in danger of running out of food, and in mid-October they began to pupate, approximately 40 days after hatching, and the first adults emerged in mid-November, approximately a month later. The remaining larvae were used for pathogen investigations, and consequently did not develop to the pupal stage, and, after the first three adults emerged (two males and a female), the remaining pupae were used for this purpose as well.

Larvae were not attended by ants, and no other species were observed within the sleeves at any point. The near-ambient conditions used for rearing these butterflies indicates the degree of variability remaining in British stocks of *P. coridon*, and suggests that, potentially, larval overwintering may occur more frequently in this species if global warming provides us with longer, warmer winters in the future: indeed, there are occasional records of autumnal larvae (e.g. Collier 1956, Fearnehough 1957) and early adults (May – M. Callow *pers. comm.*), indicating that this already occurs, albeit on a minute scale.

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THE GROUND BEETLE (COLEOPTERA: CARABIDAE) ASSEMBLAGES OF CHALK GRASSLANDS OF KNOWN AGE IN THE CHILTERNS.

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ABSTRACT

The ground beetle assemblages associated with eight grasslands forming a chronosequence of four ages are presented. Three nationally notable species, *Ophonus ardosiacus* (Lutschnik), *Ophonus schaubergerianus* (Puel) and *Panagaeus bipustulatus* (Fabr.) were encountered, all three being species associated with chalk grassland. The assemblages can be characterised by features of the vegetation of the grasslands studied and the surrounding habitats, the latter being more important than the age of the grasslands. The importance of surrounding habitats on habitat restoration, and the need for diverse indicators of restoration success are discussed.

INTRODUCTION

Calcareous grasslands are amongst the most diverse habitats in Britain and support some of the rarest British invertebrates (McLean, 1990). The invertebrate fauna associated with lowland calcareous grasslands is reviewed by Alexander (2003). These grasslands are part of the wider agricultural landscape, but changes in land-use and agricultural practice have led to the loss of more than 80% of the unimproved grasslands that were present in 1939 (Keymer & Leach, 1990). Changes in grassland management and the spatial effects of habitat fragmentation serve to reduce the diversity of the remaining habitat patches (Jefferson & Robertson, 1996). Conservation, through the better management of existing grasslands and habitat restoration, is recognised as a priority by the British government (Anon., 1994).

The ground beetles are an abundant and speciose family widely distributed in agricultural habitats (Lövei & Sunderland, 1996). The family has been widely studied because of the importance of some species as predators of agricultural pests, though the family displays a range of feeding ecologies (Lövei & Magura, 2006). They can be sampled cheaply and effectively using pitfall traps (Holland & Reynolds, 2005), and have been proposed as indicators of grassland management (Eyre *et al*., 1989) as well as land-use change (Luff & Woiwod, 1995).

Although calcareous grasslands are plagioclimax vegetation maintained by cutting or grazing, grassland restoration can be thought of as a manipulation of successional processes (Gibson & Brown, 1992). Studies of old field succession, which have a long pedigree in ecology (van Andel, Bakker & Grootjans, 1993), have much to contribute to restoration management (Mortimer, Hollier & Brown, 1998). However, long term studies of succession are, by their nature, difficult and costly, and so the use of chronosequences of similar habitats of known age represents a useful short cut (Southwood, Brown & Reader, 1979). In the study presented here, ground beetle assemblages from a series of calcareous grasslands of known age are compared to

examine their response to habitat continuity and to investigate their potential as indicators of grassland restoration success.

Methods.

The study was carried out on the National Trust's Bradenham estate in the Buckinghamshire Chilterns, where grasslands of four successional ages, ranging from recent arable reversion to ancient grassland, were identified from estate records (all north of Bradenham Village SU 827972). Two grasslands of each age were chosen for study based on ease of access. The form and location of the sites is shown in Fig.1, with site details given in Table 1. The youngest sites were Stocking Bottom (A1) and Yewtree Hill (A2). Management of the 10 year-old sites (B1 and B2), the 30 year-old sites (C1 and C2) and the ancient grassland at Small Dean Bank (D1) had been by occasional cutting. In the year of sampling, winter grazing by sheep was introduced for sites C1 and D1. The other ancient grassland site, D2, was highly invaded by scrub, and in danger of reverting to woodland.

At each of these sites ten pitfall traps were set along a transect at 3m intervals. On small or narrow sites the transect was in the central part of the grassland, larger sites had the transect projecting into the grassland from the middle of one edge, usually starting some 10m in from a marker on the boundary. The preserving medium used was blue anti-freeze and the traps were serviced weekly from the 29 May–8 July 1997. At the initial sorting of the catch the beetles were separated and identified to family. The ground beetles were selected for further study because of their abundance, and subsequently identified to species. Since the between-week differences were relatively small and reflected the prevailing weather conditions rather than site differences, this analysis uses the total catch to characterise the assemblages from each site.

Vegetation data for two of the sites (C1 and D1) were already available (Mortimer, unpublished data), the others were sampled in August 1997 when percentage cover data was collected at plant species level for ten $1m^2$ quadrats placed randomly on each site. Information about the surrounding habitats was noted at this time. A measure of between-quadrat community heterogeneity (PD) was calculated for each site ($PD = 1 - PS$, where $PS = 1 - 0.5\sum |p_a - p_b|$ and p_a is the proportion of species a, while p_b is the proportion of species b in a pair of quadrats (Collins, 1992)).

The diversity and equitability of the beetle assemblages were calculated for each site. The beetle data was explored with TWINSPAN (Hill, 1979) after the catch numbers had been log $(n+1)$ transformed because of the great inequitability of the assemblages. A similar analysis, based on presence/absence data, was performed on the vegetation data for comparison. The transformed beetle data were then used in a canonical correspondence analysis (Henderson & Seaby, 2000) to investigate the importance of the habitat factors measured.

Results

The 1044 ground beetles captured during this study belong to the 23 species (or species groups) shown in Table 2. Of these, 780 (75% of the total) were of a single species, *Pterostichus madidus* (Fabr.), and this proportion was even greater for some of the assemblages. The extreme dominance of assemblages by this species is not uncommon in arable contexts (Holland & Reynolds, 2005), but interestingly in this study it was the older grassland sites that were more inequitable. Three of the species recorded, *Ophonus ardosiacus* (Lutshnik), *Ophonus schaubergerianus* (Puel) and *Panagaeus bipustulatus* (Fabr.), are classed as nationally notable "b" (Hyman &

Parsons, 1992), and as characteristic of lowland calcareous grassland (Alexander, 2003).

While the vegetation of the grasslands showed a straightforward effect of grassland age (Fig. 2a), the ground beetle assemblages did not (Fig. 2b). In the beetle analysis, the first division separated one of the ruderal sites from all of the others.

Fig. 1. Sketch map of the study sites on the National Trust Bradenham Estate, Bucks.

Table 1. The study sites and their environmental characteristics.

Field Site	Grassland Age[1]	No. species[2]	% Cover[3]	Hetero-geneity[4]	Arable[5]	Wood[5]
A1 Stocking Bottom	2	17.5	69	22	+	+
A2 Yewtree Hill	2	25.1	81	32.5	+	+
B1 Munt's Hill	10	21.0	82	35	+	–
B2 Gunner's Hill	10	17.8	85	40	+	+
C1 Butterfly Bank	30	29.4	91	35	+	+
C2 Gunner's Bank	30	19.4	85	35.5	+	–
D1 Small Dean Bank	>200	29.6	92	21.5	–	+
D2 Park Wood	>200	21.4	78	33	–	+

[1]Grassland age in years since arable abandonment. [2]Average number of plant species per m^2 in ten quadrats. [3]Percentage vegetation cover in ten quadrats. [4]Between quadrat heterogeneity. [5]Presence of adjacent arable and adjacent woodland.

The most likely interpretation is that the amount of bare ground at this site was the important factor, and this is supported by the fact that the sole indicator species identified by the analysis was *Amara bifrons* (Gyllenhal), a species associated with sparse vegetation. At the second division the sole indicator species was *Badister bullatus* (Schrank), a shade-tolerant ground beetle, and the sites are segregated more

Table 2. The ground beetle assemblages recorded from the study sites (nomenclature follows Löbl & Smetana, 2003). Species marked with an asterisk are characteristic of lowland calcareous grassland (Alexander, 2003)

	A1	A2	B1	B2	C1	C2	D1	D2
Abax parallelepipedus (Piller & Mitterpacher)	0	4	0	0	1	0	0	6
Amara aenea (De Geer)	0	1	1	0	1	0	0	0
Amara aulica (Panzer)	0	0	8	0	0	3	1	0
Amara bifrons (Gyllenhal)	1	0	0	0	0	0	0	0
Amara convexior/communis	1	1	2	8	9	0	2	3
Amara familiaris (Duftschmid)	0	2	1	0	2	0	2	1
Amara montivaga Sturm	64	0	0	0	0	0	0	0
Badister bullatus (Schrank)	0	3	3	0	0	1	0	0
Bradycellus verbasci (Duftschmid)	0	0	1	0	0	0	0	0
Calathus fuscipes (Goeze)	0	3	9	2	0	12	0	2
Carabus violaceus L.	1	0	6	6	0	0	0	0
Harpalus affinis (Schrank)	0	1	1	0	1	2	3	0
Harpalus latus (L.)	0	0	0	0	6	0	1	1
Harpalus rubripes (Duftschmid)	0	2	0	0	0	1	2	0
Harpalus rufipes (De Geer)	5	2	14	4	1	20	1	2
Nebria brevicollis (Fabr.)	0	0	0	0	1	5	0	0
Notiophilus rufipes Curtis	2	0	0	0	0	0	0	0
Ophonus ardosiacus (Lutshnik)*	0	1	0	0	0	0	0	0
Ophonus puncticeps Stephens	0	0	0	2	0	0	1	0
Ophonus schaubergerianus (Puel)*	0	2	0	0	2	2	0	0
Panagaeus bispustulatus (Fabr.)*	0	0	0	0	0	1	0	0
Pterostichus madidus (Fabr.)	53	13	88	292	29	62	78	165
Stomis pumicatus (Panzer)	0	0	1	0	0	0	0	0

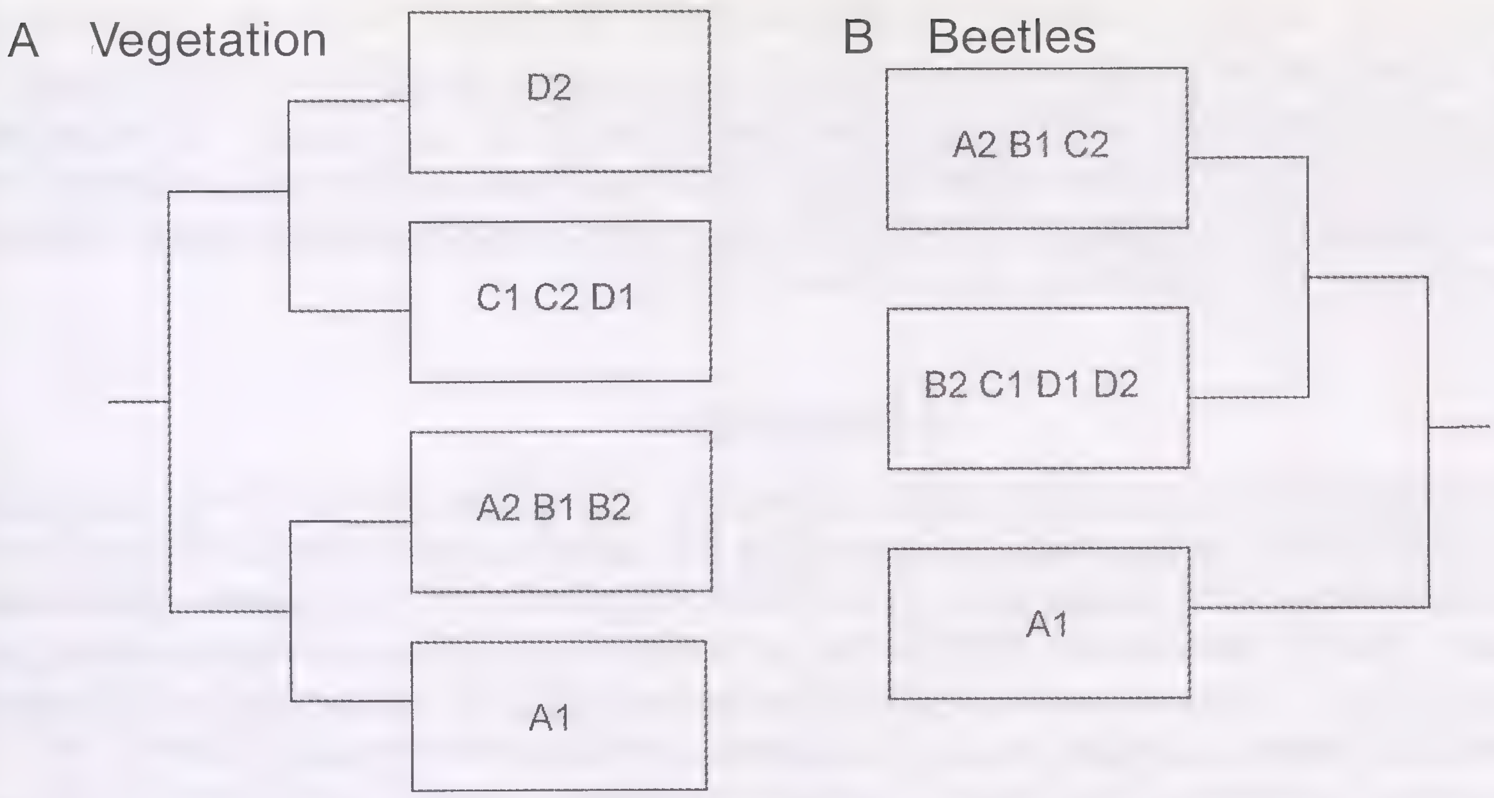

Fig. 2. Grouping of the study sites, based on assemblage composition, using TWINSPAN: (A) vegetation (presence/absence data, eigenvalue of first axis 0.458, eigenvalue of second axis 0.302); (B) ground beetle assemblages ($\log(n+1)$ catch totals, eigenvalue of first axis 0.427, eigenvalue of second axis 0.335).

by the presence or absence of adjacent woodland or arable cultivation than by grassland age.

The results of canonical correlation analysis, presented as a vector plot in Figure 3, substantiate this interpretation. The first three canonical axes explain 68% of the variance, and each is strongly correlated with one of the environmental parameters used in the analysis. The first axis, explaining 36% of the variance, has a correlation of -0.86 with the amount of bare ground at the study site. The second axis,

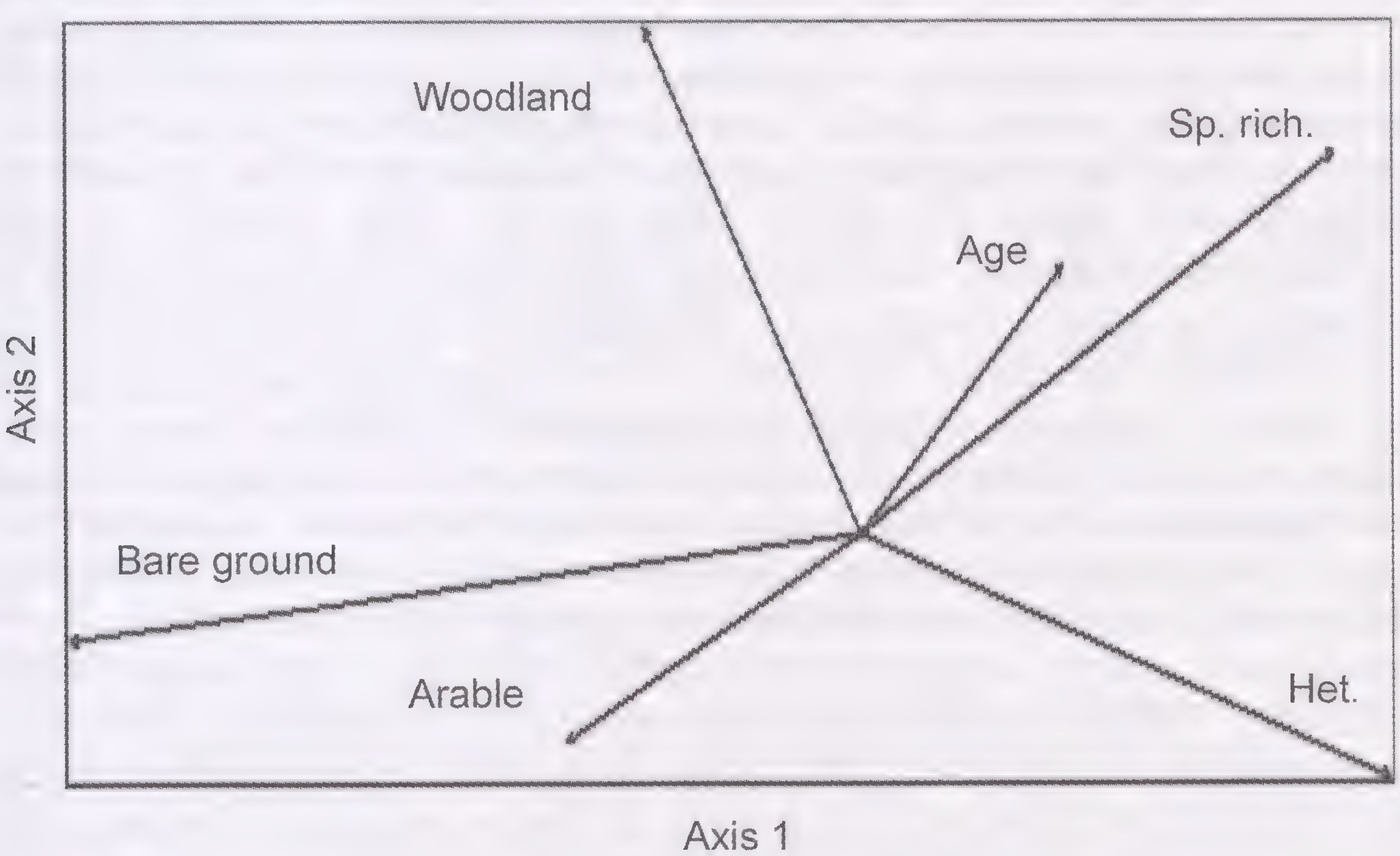

Fig. 3. Canonical correspondence analysis eigenvector plot on first two axes; length of vector indicates the importance of the environmental factor, the direction indicates the relationships between the factors (environmental factors: Bare ground (% cover); Woodland (presence of adjacent woodland); Arable (presence of adjacent arable); Age (time since arable cultivation); Sp. Rich (plant species richness); Het. (within-site heterogeneity)).

explaining 18% of the variance, is very strongly correlated with the presence of adjacent woodland (r = 0.92), while the third axis, explaining 14% of the variance, is strongly correlated with the presence of adjacent arable (r = −0.82). It is interesting to note that site age (or time since last cultivation) was a relatively unimportant measure (the highest correlation being 0.48 with axis 2) despite the obvious trend in the clustering of the vegetation assemblages in Fig. 2.

Discussion

The potential for insects to be better indicators of habitat quality than the simple presence of certain plant species has long been recognised, and is especially pertinent for communities, like calcareous grasslands, typified by long-lived perennials (Mortimer, Hollier & Brown, 1998). This is because insect assemblages reflect not only plant species composition but also vegetation structure and plant architecture and provide a more complete picture (Southwood, Brown & Reader, 1979).

The vegetation of the grasslands studied showed a typical old field succession sequence, with the replacement of short lived, highly dispersive ruderal species by longer lived, slow growing plants until typical chalk grassland communities were present. The ground beetle assemblages, containing herbivores, omnivores and predators, while clearly sensitive to vegetation structure and cover, did not show a similar pattern. In contrast to the strictly phytophagous communities studied by Brown & Hyman (1986), they responded more to the nature of the surrounding habitats than to grassland continuity. The ground beetle assemblages contained elements characteristic of lowland calcareous grassland (Alexander, 2003), but interestingly these were not restricted to the older study sites.

In interpreting these results the nature of ground beetle foraging and the relatively small size of some of the sites are probably relevant. Ground beetles are generally active at the soil surface and many species are therefore more likely to move between vegetation types than are those of groups that are more tightly linked to specific host plants. Other studies have shown that the changes associated with succession can provide the simplest explanation of observed changes in ground beetle assemblage composition (Gobbi *et al.*, 2007), and the importance of habitat structural complexity as well as continuity has been demonstrated for ground beetle assemblages (Fuller, Oliver & Leather, 2008). In this study the effect of within-plot vegetation heterogeneity was relatively small, but the different habitat types form a mosaic at a relatively small scale. Although the amount of grassland habitat adjacent to sample sites can be important for ground beetles (Hartley *et al.*, 2007), different species probably respond to patchiness at different scales, and so assemblages may be defined by the ecological constraints applying to the mosaic at a wider scale than that of the smallest patches (MacDonald *et al.*, 2000). The importance of adjacent non-grassland habitats in explaining the distribution of some grassland species is also documented for other groups (Fartmann, 2006).

The consequences of heterogeneity for habitat restoration are complex, even for plants (Bakker, 2000). Coupled with the potential for stochastic differences in subsequent colonisation by insects (Mortimer *et al.*, 2002), it is clear that the nature of surrounding habitat mosaics could have profound consequences for the outcome of restoration projects. The present study, showing that at least some insect groups responded more to adjacent habitat types than vegetation succession, reinforces the view that a true evaluation of restoration success should encompass several kinds of indicator group, and that the positioning of restoration projects within the surrounding landscape should be included in the design of such projects.

Acknowledgements

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Is the eriophyoid mite *Cecidophyes galii* truly present in Britain? – Prior to Craemer *et al.*, (1999) it was assumed that the eriophyoid mite *Cecidophyes galii* (Karpelles) was solely responsible for the distinctive and commonly encountered leaf galls found on cleavers *Galium aparine* (L.). However, *Cecidophyes rouhollahi* Craemer, a species known to occur on the same host in Britain causes the formation of galls that are indistinguishable from those of *C. galii*. Therefore neither *C. galii* nor *Cecidophyes rouhollahi* Craemer can or should be recorded on the evidence of galls alone. Although there is no difference in gall morphology between the two mite species, the mites can be separated by microscopic examination.

Fig. 1. Cleavers, in UK, showing typical leaf deformations caused by a *Cecidophyes* mite.

The paper by Craemer *et al.,* (1999) also casts doubt on weather *C. galii* has ever been found in Britain! I would like to try and resolve this issue by examining samples of galled *G. aparine* from as many locations in Britain as possible. If you do come across the galled leaves of *G. aparine* I would appreciate a sample (see Fig.1).

Please send leaves in a sealed plastic bag together with the following collection details: date and location of find (ideally, Ordinance Survey (OS) map no. and six digit grid ref.) to: J. C. Ostojá-Starzewski, The Food & Environmental Research Agency, Sand Hutton, York YO41 1LZ. Email: joe.ostoja-starzewski@fera.gsi.gov.uk

Reference

Craemer, C., Sobhian, R., McClay, A. S. & Amrine, Jr. J. W., 1999. A new species of *Cecidophyes* (Acari: Eriophyidae) from *Galium aparine* (Rubiaceae) with notes on its biology and potential as a biological control agent for *Galium spurium*. *International Journal of Acarology* **25**: 255–263.

TROPICAL FUNGUS GNATS ESTABLISHED IN NURSERIES IN THE NETHERLANDS (DIPTERA: KEROPLATIDAE AND MYCETOPHILIDAE)

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ABSTRACT

Three species of Keroplatidae and two species of Mycetophilidae were found in association with hothouse plants at nurseries in the Netherlands. One of these, *Leia arsona* Hutson, was already known to be widespread in association with cultivation in Mediterranean and subtropical climates and has probably been introduced to more temperate regions by horticulture. The other four species include three known species of Neotropical origin (*Lyprauta chacoensis* (Edwards), *Proceroplatus trinidadensis* (Lane), *Sciophila fractinervis* Edwards), which have not previously been reported outside South or Central America, while the other species ***Lyprauta cambria* sp. nov.** is newly described but is also considered to be Neotropical in origin.

INTRODUCTION

In 2005 PJC began to receive material from JP of fungus gnats found in association with cultivated plants in Nurseries in The Netherlands. These included many specimens of *Leia arsona* Hutson, 1978 (Mycetophilidae), already well known to occur in association with cultivation in countries with a Mediterranean climate but also introduced to Britain on at least two occasions (Hutson, 1978; Halstead, 2004) and previously recorded on *Gerbera* (Asteraceae) in The Netherlands by Burger, de Goffau & Elenberg (1984). Also present were many specimens of Keroplatidae belonging to two genera, *Lyprauta* Edwards, 1931 and *Proceroplatus* Edwards, 1925, and a few specimens of *Sciophila* Meigen, 1818 (Mycetophilidae). These evidently belonged to species not native to Europe and a survey of the literature on the genera concerned led to the conclusion that all were of South or Central American origin.

Introduction with plants from the country of origin was the most likely route by which they had arrived in Europe. This was not necessarily related directly to importation of any of the plants with which they have been found to be associated in the Netherlands. While most of the plant genera involved have a South American origin, *Gerbera* originates from South Africa while the orchids involved are hybrid cultivars, the genus *Phalaenopsis* being of Oriental origin while "Cambria" is a horticultural term for a range of hybrids, some between different genera.

As these species have evidently been established in The Netherlands for some years and are already present at several locations it must be concluded that they may also be present but as yet overlooked in other parts of Europe. In view of the international trade in the plants involved, their arrival in the British Isles is anticipated and the possibility that this has already taken place cannot be excluded, however well any regulations concerning the importation of plants have been observed. These species are described and characterised here so that recognition will be practicable should they be found at other locations.

Leia arsona is already known to have wide plant associations and it is considered likely that its larvae are mainly feeding on fungal mycelium where some decay has

occurred, although the possibility that it also feeds on plant tissues cannot be excluded. An association with mycelium may also apply to the species of *Sciophila*, a genus of which most species that have been reared develop in fruiting bodies of wood-decaying fungi.

A number of Keroplatidae are known to have predaceous larvae. The initial assumption, when the three species of this family were found to have similar associations and were sometimes accompanied by *L. arsona*, was that their larvae were predaceous on *Leia* larvae. This has not been confirmed and observations by JP suggest that larvae of *Lyprauta* were damaging roots of the orchids, of the genus *Phalaenopsis* and of the "Cambria" hybrids. As nothing appears to have been recorded previously concerning the biology of *Lyprauta* or *Proceroplatus* species further speculation on this is not practicable.

Abbreviation: BMNH = Natural History Museum, London.

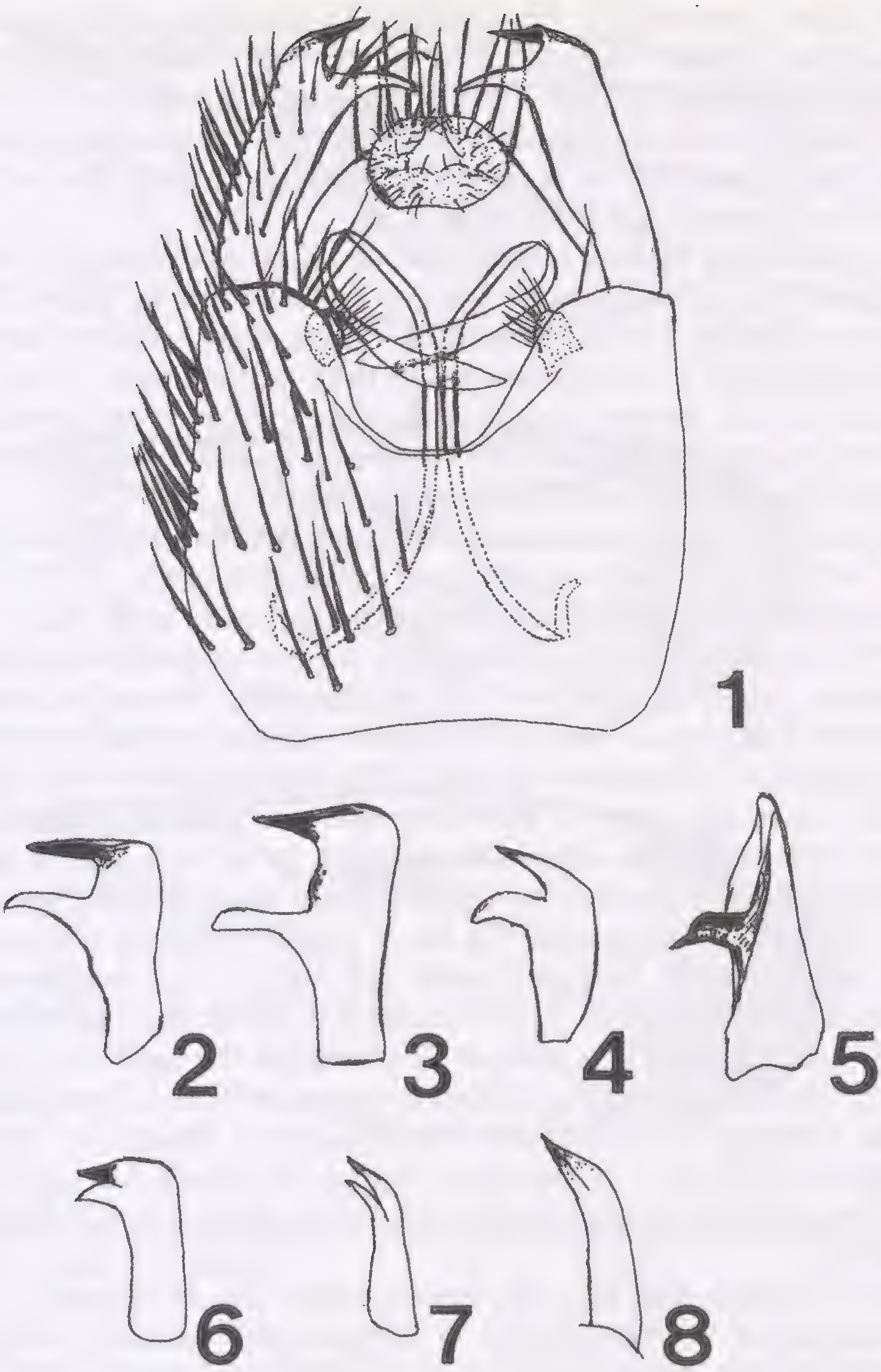
Family Keroplatidae
Genus *Lyprauta* Edwards, 1931

Evenhuis (2006) listed 25 species of this genus worldwide, of which one, *L. oberthueri* (Matile, 1967) was European, three Afrotropical (Cameroon, Central African Republic and Madagascar, respectively) and the remainder found in North and South America. The latter comprise the eight species listed from the Neotropical Region by Papavero (1978), one species described from Grenada by Matile (1982) and twelve North American species transferred to this genus from *Platyura* Meigen, 1803 by Evenhuis (2006).

Two species of *Lyprauta* were present in this material, which were similar in many respects, both having two internal sclerotised tooth-like processes on the gonostylus, of which one is in an apical position. They differ most obviously from each other in that one has almost clear wings with only a faint central spot while the other also has the wing apex distinctly brown. The first of these also has the processes on the gonostylus more widely separated.

Matile (1982) defined a species group within *Lyprauta* with this type of gonostylar structure, i.e. presence of two sclerotised tooth-like processes. He placed in this group five Neotropical species *L. amazonensis* (Lane, 1958), *L. chacoensis* (Edwards, 1931), *L. nubilapex* (Edwards, 1940), *L. paraensis* (Lane, 1958) and *L. zeteki* (Lane, 1950). Of these *L. amazonensis* differs in not having a process in an apical position on the gonostylus. The figure of *L. defecta* (Edwards, 1931) by Matile (1982) suggests that it has fused or closely approximated teeth appearing as a single process (Fig. 8); Matile excluded it from this group, stating that it was allied to *L. knabi* (Lane, 1950), which has a simple apically pointed gonostylus. It should be noted that the genus as a whole has not been revised and it is unclear whether the group referred to by Matile has any phylogenetic significance.

The species from the nurseries with lightly marked wings was concluded to be *L. chacoensis* (Edwards, 1931) by comparison with Brazilian specimens of this species at BMNH. Edwards described this species from a single female from Argentina and later (Edwards, 1940) assigned over 50 males from Nova Teutonia, Brazil to it. He did not figure the genitalia but in the same paper he described *L. nubilapex* (Edwards, 1940) from 10 males and 5 females in the same material from Nova Teutonia, noting that the genitalia are very similar to *L. chacoensis* and that it differed principally in the presence of wing markings, which are very similar to those of the second species of *Lyprauta* in the present material. Lane (1958) figured the gonostylus of *L. chacoensis* and *L. nubilapex*, the latter from a syntype, his figures suggesting



Figs 1–8. *Lyprauta* species, male genitalia; 1, *L. cambria* sp. n., ventral view with parameres, tergite 9 and cerci in situ; 2–8, outline of gonostylus of allied species based on the literature (2–5 after Lane, 1958, 6 after Lane, 1950, 7 after Shaw, 1941 and 8 after, Matile, 1982): 2, *L. chacoensis* (Edwards) sensu Lane, 1958; 3, *L. nubilapex* (Edwards); 4, *L. paraensis* (Lane); 5, *L. amazonensis* (Lane); 6, *L. zeteki* (Lane); 7, *L. miriamae* (Shaw); 8, *L. defecta* (Edwards).

that the tooth-like processes are closer together in *L. chacoensis* than in *L. nubilapex*. However, the present material assigned to *L. chacoensis* and the series of both species examined at BMNH do not differ significantly from his figure of *L. nubilapex* in the spacing of the processes on the gonostylus, so it is possible that Lane's figure of *L. chacoensis* was drawn from a different species. The slight protuberance bearing bristles, situated between the processes in *L. nubilapex*, is absent in *L. chacoensis* and is a possible specific character.

In having the basal tooth-like process closer to the apex of the gonostylus *L. paraensis* and *L. zeteki* are closest to the second species in the present material. Both also have similar wing markings, which are more strongly developed in *L. zeteki*

according to Lane's description. Lane (1950) described *L. zeteki* from Panama; then (1960) he recorded it from Trinidad, but only on one female, so the identity of the Trinidad record cannot be certain. Matile (1982) added a record for Colombia. Lane (1958) described *L. paraensis* from Brazil. However, the precise arrangement of the processes on the gonostylus is apparently different in each case according to his figures, which are reproduced here (Figs 4, 6).

The North American species also require revision but male genitalia of seven of them were figured by Johannsen (1910) and a further three by Shaw (1935, 1941), the two others being known only from females. These show a wide diversity of form of the gonostylus and only *L. miriamae* (Shaw, 1941) among them is near to the species considered here in this respect, as it has the apical part of the gonostylus bifurcate but differs in having the branches closely approximated (Fig. 7), so its relationship to the Neotropical species discussed above is uncertain.

Of the Afrotropical species one is known only from the female (Matile, 1970) while the genitalia of the other two were figured by Matile (1974, 1977). They have the gonostylus unforked and of a quite different structure in each case.

Matile (1967) described *Platyura oberthueri* from a single specimen collected in the French Pyrenees. Although the late Loïc Matile (*pers. comm.*) recognised that this species belonged to *Lyprauta* this combination was not formally established by him and the genus was not included in the key to Palaearctic genera by Søli, Vockeroth & Matile (2000). Its assignment to *Lyprauta* was accepted by Chandler (2005) and followed by Evenhuis (2006), which although not stated was its first publication as a new combination. The genitalia of this species were figured by Matile (1967); according to his figures the gonostylus has a large sclerotised internal apical tooth-like process and a smaller similar process just basad to it, suggesting relationship with the species dealt with here. The holotype (of which the abdomen and antennae had suffered pest damage) was loaned but without the genitalia, which had been mounted on a microscope slide, so further comparison was not practicable. One wing had also been mounted on a slide and was figured by Matile (*op. cit.*). The wing is more strongly marked than in the other species examined, having a broad median brown band extending from the costa to CuA_1 in addition to the widely brown wing apex beyond R_4.

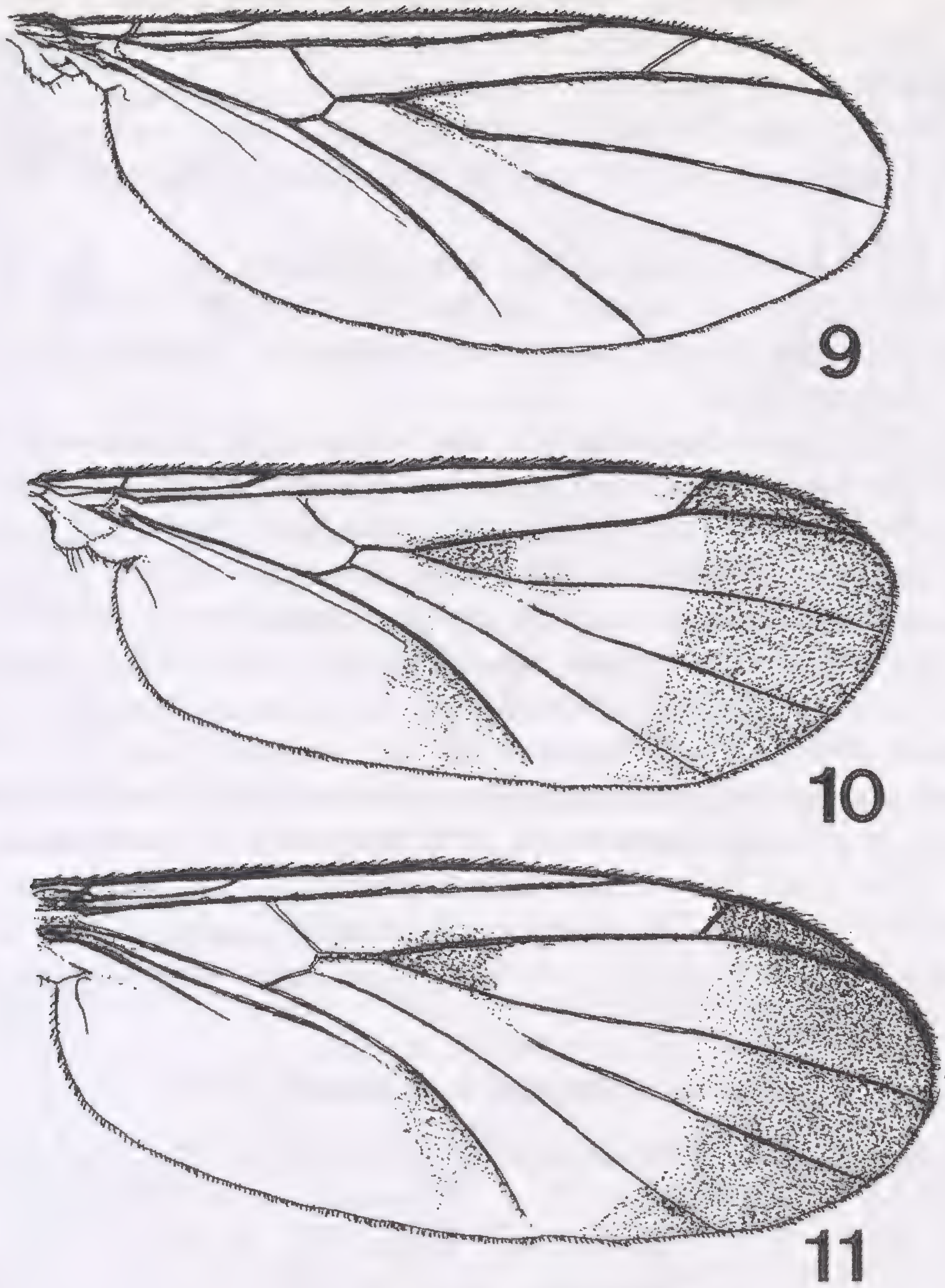
It is therefore concluded that the species from Dutch nurseries is undescribed, although assumed to be Neotropical in origin and it is described here as a new species.

Lyprauta cambria sp. n.

Material. Holotype male: The Netherlands, Zuid-Holland, Westland, week 51/2004, ex "Cambria" (Orchidaceae) (deposited in the Natural History Museum, London).

Paratypes: The Netherlands: Zuid-Holland: 2 ♀, Nootdorp, week 25/2008, ex "Cambria" (Orchidaceae); 1 ♂, 1 ♀, Westland, week 15/2005, ex *Phalaenopsis* (Orchidaceae); 1♀, Westland, week 48/2005, ex *Peperomia* (Piperaceae); 6 ♂, 2 ♀, Berkel en Rodenrijs, 6.xii.2005, ex *Phalaenopsis* (Orchidaceae); 2 ♂, 2 ♀, Bleiswijk, week 46, 7.x.2005, ex "Cambria" (Orchidaceae). The Netherlands, Noord-Holland, 1 ♂, 2♀, De Hoek, 2.xii.2005, ex *Phalaenopsis* (Orchidaceae); 5 ♀, De Kwakel, 18.v.2005, ex "Cambria" (Orchidaceae).

Other material: The Netherlands, Noord-Holland, 16 specimens, De Kwakel, week 33/2005, sample no 1, ex light trap near *Phalaenopsis* (Orchidaceae); 1 ex, De Kwakel, xii.2005, ex "Cambria" (Orchidaceae).



Figs 9–11 Wings of *Lyprauta* species: 9, *L. chacoensis* (Edwards), male; 10, *L. cambria* sp. n., male; 11, *L. cambria* sp. n., female.

Description. *Male*. Head dark brown, antenna and palpus brown. Antenna short, with flagellomeres broader than long, except more elongate terminal flagellomere.

Thorax with mesonotum brownish yellow bearing three brown stripes. Scutellum, lower half of katepisternum, laterotergite and mediotergite brown, pleura otherwise yellow. Mesonotum uniformly clothed with short dark bristles with 2–3 longer prescutellar bristles on each side in dorsocentral rows. Scutellum with short marginal bristles. Propleuron bristly, other sclerites bare.

Wing (Fig. 10) with apical part broadly brownish, extending more or less evenly to hind margin from just before vein R_4, a large medial patch between bases of R_{4+5} and M_{1+2}, extending into adjacent cells and a smaller patch behind CuA_2 at same level as medial patch. Veins dark brown, especially costa, radial sector (except Rs), CuA stem and CuA_2. Base of M_2 unpigmented and vein appearing abbreviated.

Legs yellow, elongate and slender. Tibial setulae in regular rows. Mid and hind tibiae with 2 spurs, but the anterior spur not much longer than apical width of tibia and about a quarter length of the posterior spur.

Abdomen with tergites and sternites of segments 1–5 brown basally, yellow on apical third to half, 5 sometimes all brownish, 6 all brown, narrow segments 7–8

brownish yellow. Genitalia (Fig. 1) mainly yellow, with gonostylus darker apically including the two internal processes; subapical process close to apical process; parameres broadened and blade-like on apical part.

Female. Similar to male. Wing (Fig. 11) with anal lobe more rounded. Abdomen broader, yellow bands on tergites 1–5 in specimens examined. Ovipositor short, retracted.

Wing length 2.7–3.3 mm (male), 3.0–3.6 mm (female).

Etymology. This species is named for the orchids with which it was most often recorded, Cambria being a term used in horticulture to describe a range of hybrids, and is a noun in apposition.

Remarks. This species is described as new because the structure of its gonostylus differs from the previously described species of the genus (see discussion above). The outline of the gonostylus of the other species discussed above is reproduced here for comparison (Figs 2–8). Female genitalia have not been studied in this genus and it has not been established if there are any specific characters in the ovipositor, so it is considered premature to characterise species on this structure at present.

Biology. Larvae were found associated with the roots of orchids, both "Cambria" hybrids and those of the genus *Phalaenopsis* and resulting damage to the roots was observed. JP reared this species from larvae collected from the premises of a grower. They were reared in climate chambers at 20°C and at 28°C. At the lower temperature they lived for more than four weeks before pupation, but the time since hatching from the egg was not known. The pupal stage lasted 6–7 days at 20°C and 4–5 days at 28°C. Emerging adults survived for 4–6 days. Some eggs were laid but did not hatch.

Lyprauta chacoensis (Edwards, 1931)

Material examined. The Netherlands, Zuid-Holland: 6 ♂, Nootdorp, week 25/2008, ex "Cambria" (Orchidaceae); 1 ♂, Westland, week 47/2006, ex *Phalaenopsis* (Orchidaceae); 1 ♂, 1 ♀, Berkel en Rodenrijs, 6.xii.2005, ex *Phalaenopsis* (Orchidaceae); 15 ♂, 1 ? ♀, Bleiswijk, week 46/2005 [7.xii.2005], ex "Cambria" (Orchidaceae); 1 ♂, Pijnacker, 21.vi.2005, ex *Gerbera* (Asteraceae). The Netherlands, Noord-Holland: 2 ♂, 1♀, De Hoek, 2.xii.2005, ex *Phalaenopsis* (Orchidaceae).

Description. Male. Similar in most respects to *L. cambria*, differing mainly in the less distinct wing markings and in the structure of the genitalia. Head dark brown, antenna brown and palpus brownish yellow. Antenna short with flagellomeres shorter than broad, except more elongate terminal flagellomere.

Thorax with mesonotum yellowish at sides and on humeral areas with three more or less fused dark brown stripes on disc, sometimes yellow coloration obscure and appearing more darkened. Propleuron yellow, pleura otherwise and mediotergite brown.

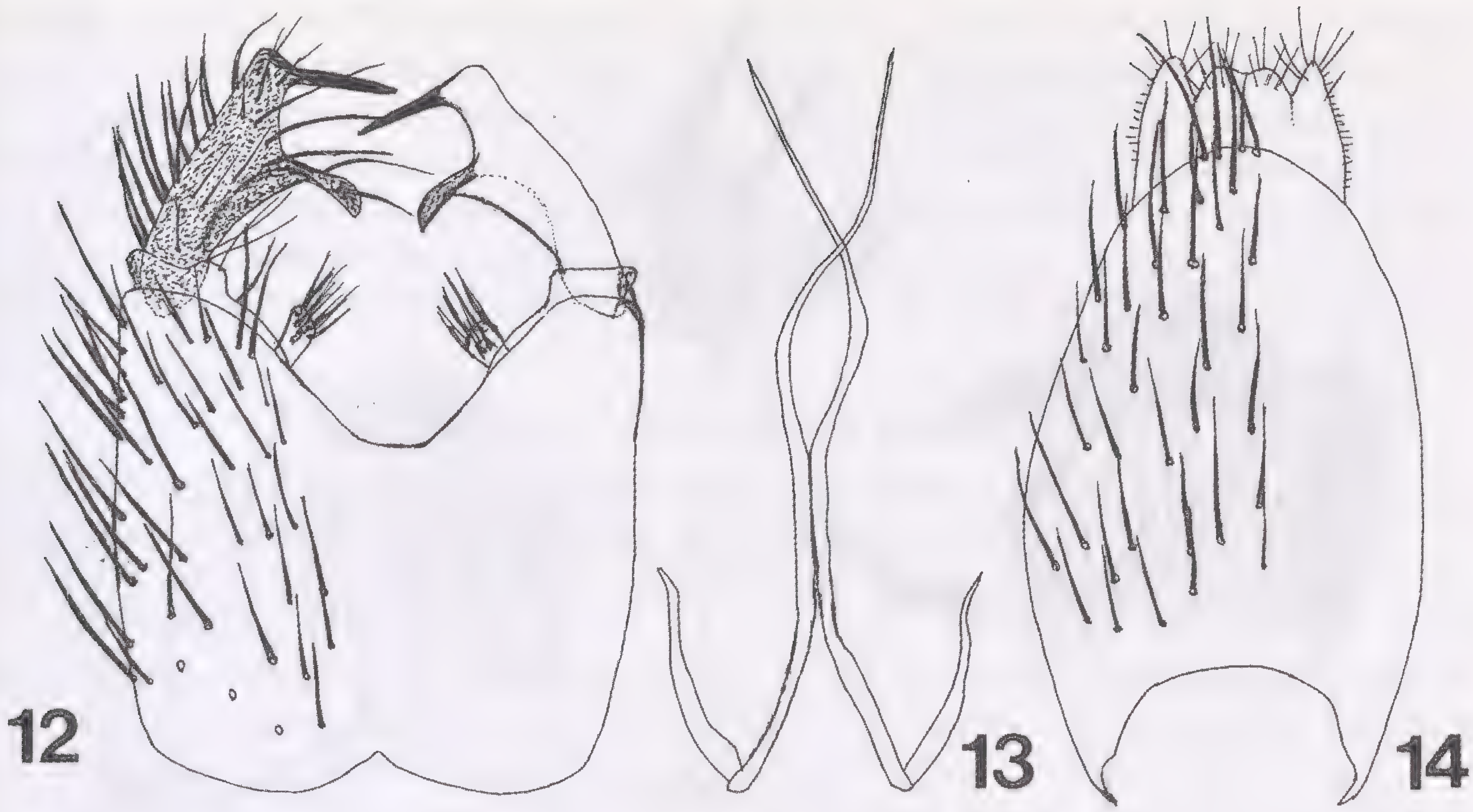
Wing (Fig. 9) with a distinct dark spot between bases of R_{4+5} and M_{1+2}, other markings absent or faintly indicated near costa beyond R_4 and behind CuA_2.

Legs slender, yellow.

Abdomen mostly dark brown with tergites and sternites of segments 2-4 yellow apically for 0.4–0.5 of length. Genitalia (Figs 12–14) brownish yellow with gonostylus dark apically and on internal processes (Fig. 12). Parameres (Fig. 13) slender apically. Tergite 9 (Fig. 14) rounded apically, similar to *L. cambria*.

Wing length 2.6–2.7 mm (male), 3.0–3.6 mm (female).

Remarks. In BMNH there are 33 males, 1 female and 3 lacking abdomen (so sex not determined) from Brazil, Nova Teutonia, Santa Catharina, all *leg*. F. Plaumann on various dates in 1936–1938. There is also one female from Brazil, São Paulo, Rio Claro, ii.1930, *leg*. Borgmeier.



Figs 12–14. Male genitalia of *Lyprauta chacoensis* (Edwards): 12, ventral view of gonocoxites and gonostyli; 13, parameres; 14, dorsal view of tergite 9 and cerci.

Genus *Proceroplatus* Edwards, 1925

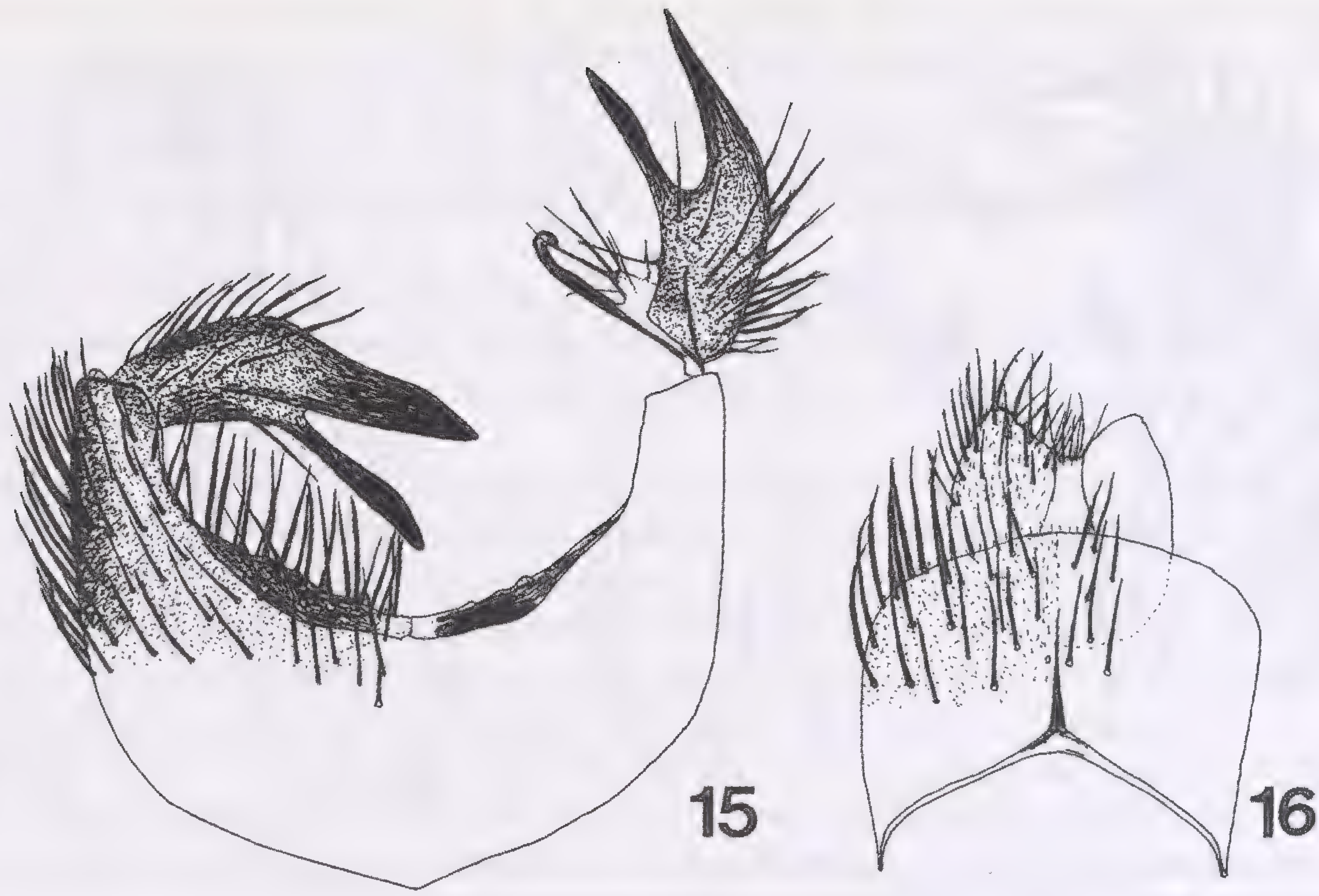
Evenhuis (2006) listed 37 species of this genus, mainly distributed in the tropics (24 Neotropical, 4 Oriental, 4 Australasian, 3 Afrotropical), with two of the Neotropical species extending into the southern Nearctic, but also including one widespread Nearctic species, *P. elegans* (Coquillett, 1895), reaching Canada and one Palaearctic species *P. mikado* (Okada, 1938) in Japan. Søli, Vockeroth & Matile (2000) first recognised that the latter species belonged to this genus and included it in their key to Palaearctic genera. The specimens studied are considered to be *P. trinidadensis* (Lane, 1960) as they agree well with Lane's description and figure of the gonostylus.

Matile (1982) indicated that *P. trinidadensis* belonged to a group characterised by the gonostylus being deeply divided into two lobes of similar length of which the apical (external) was more robust. This group also included *P. borgmeieri* (Shaw, 1940) and *P. vittatus* (Fisher, 1941), both described from Costa Rica and an undescribed species from Mexico. Of these *P. borgmeieri* is closest to *P. trinidadensis* but differs, according to the figure by Shaw (1940) in the slender basal process of the gonostylus being longer (extending well beyond the level of the base of the two lobes) and the antennae entirely yellow. Fisher (1939) figured *P. vittatus* under the name *Platyura* (*Proceroplatus*) *pictipennis* Williston, 1896 but she later described it as a new species (Fisher, 1941).

Matile (1982) mentioned the species described as *P. vilasboasi* (Lane, 1961) from Brazil as near to this group but with the lobes of the gonostylus as of equal thickness. It should be noted that Matile (*op. cit.*) emended the name of this species to *P. vilasboasorum* as it was named after two brothers (Lane, 1961); that change was not mentioned by Evenhuis (2006).

Proceroplatus trinidadensis (Lane, 1960)

Material. The Netherlands, Zuid-Holland: 4 ♂, 2 ♀, Westland, week 46/2005, ex *Beaucarnea* (Nolinaceae); 1 ♂, 1 ♀, Westland, week 15/2005, ex *Anthurium* (Araceae); 4 ♂ 1 ♀, Westland, week 46/2005, ex *Beaucarnea* (Nolinaceae); 1 specimen, Westland, week 48/2005, ex *Peperomia* (Piperaceae); 1 ♂, 1 ♀, Bleiswijk, week 52/2005, ex



Figs 15–16. Male genitalia of *Proceroplatus trinidadensis* (Lane): 15, ventral view of gonocoxites and gonostyli (right gonostylus deflected); 16, dorsal view of tergite 9 and cerci.

Alocasia (Araceae); 2 ♂, Bleiswijk, week 1/2006, ex *Peperomia* (Piperaceae); 14 ♂, 1 ♀, Bleiswijk, week 46 (7.x) 2005, ex *Phalaenopsis* (Orchidaceae). The Netherlands, Noord-Holland: 6 ♂, Kudelstaart 18.v.2005, ex "Cambria" (Orchidaceae).

Description. *Male*. Head dark brown with short brown palpus. Antenna with scape and pedicel yellow; flagellum brown with a paler streak laterally on flagellomeres 1–5, strongly compressed laterally with flagellomeres 2–3 × broad as long; first flagellomere bristled over most of its surface but other flagellomeres densely bristled on dorsal margin and 1–2 bristles on ventral margin, otherwise bare.

Thorax with mesonotum brown on disc, its side margins and most of pleura yellow; scutellum, laterotergite and mediotergite mainly brown. Mesonotum uniformly clothed with short bristles, longer bristles forming a prescutellar fringe as long as scutellum, latter with dense marginal bristling up to 1.5 × scutellar length; proepisternum and laterotergite bristly, other sclerites bare.

Wing with a clear membrane bearing several dark markings, which are variable in extent, the patch between CuA and the wing margin especially varying in size (Figs. 17–18).

Legs yellow, slender. Tibial setulae in regular rows. Mid and hind tibiae with a few short anterior bristles. All tibiae with a single well-developed spur.

Abdomen with tergite 1 yellow, 2–4 mainly brown with yellow apical margins, 5 mainly yellow with only a vague brown shade near base, 6–7 all brown; 7 about two thirds length of 6, 8 narrow and yellowish. Tergite 9 and cerci (Fig. 16) brownish yellow. Gonocoxites (Fig. 15) yellow basally, brown apically including most of side margins, gonostylus brown.

Female. Similar to male but abdomen more extensively brown including basal half of tergite 5 and most of sternite 6; ovipositor short.

Wing length of male (four examples) 2.5–2.8 mm, female (one example) 3.1 mm.

Remarks. This species has a wide distribution in Central and South America. It was described from three males from Trinidad (Lane, 1960). Matile (1982) reported a

further record from Trinidad and recorded it from Panama and Ecuador. He also indicated that material from Trinidad assigned to *P. paramariboensis* Edwards, 1934 by Lane (1960) correctly belonged to *P. trinidadensis*. As *P. paramariboensis* was described from a female Lane designated an allotype but this was a misidentification, not a new synonymy as stated by Matile. Lane examined nine males and one female and there were four males under the name *P. paramariboensis* at BMNH, which have data corresponding to some of Lane's specimens, all of which are *P. trinidadensis*.

Recognition of *Proceroplatus* and *Lyprauta*

To aid recognition of these genera the key to British genera of Keroplatidae by Hutson *et al.* (1980) may be modified to include them as follows.

8. Laterotergite [pleurotergite of Hutson *et al.* (1980)] hairy 8a
– Laterotergite bare 9
8a. Antenna compressed. Mesonotum uniformly setulose. Tibial setulae in regular rows throughout. Wing with a pattern of dark spots. . *Proceroplatus* Edwards
Antenna cylindrical. Mesonotum with bare stripes. Tibial setulae irregular on basal half of tibia. Wing clear or with some dark shades but without a distinct pattern . . . . *Monocentrota* Edwards
9. Branches of median and posterior forks with close-set small macrotrichia above 10
– Branches of median and posterior forks bare above 13
13. Mid and hind tibiae with anterior spur well developed. Prospiracular bristles absent. Mediotergite [postnotum of Hutson *et al.* (1980)] bristly . . . . *Orfelia* Costa
– Mid and hind tibiae with anterior spur short 14
14. Bristles present on posterior margin of anterior spiracle. Mediotergite bristly. Vein M_2 complete . . . . *Rutylapa* Edwards
– Bristles absent on posterior margin of anterior spiracle. Mediotergite bare. Vein M_2 weak or interrupted at base. . . . . *Lyprauta* Edwards

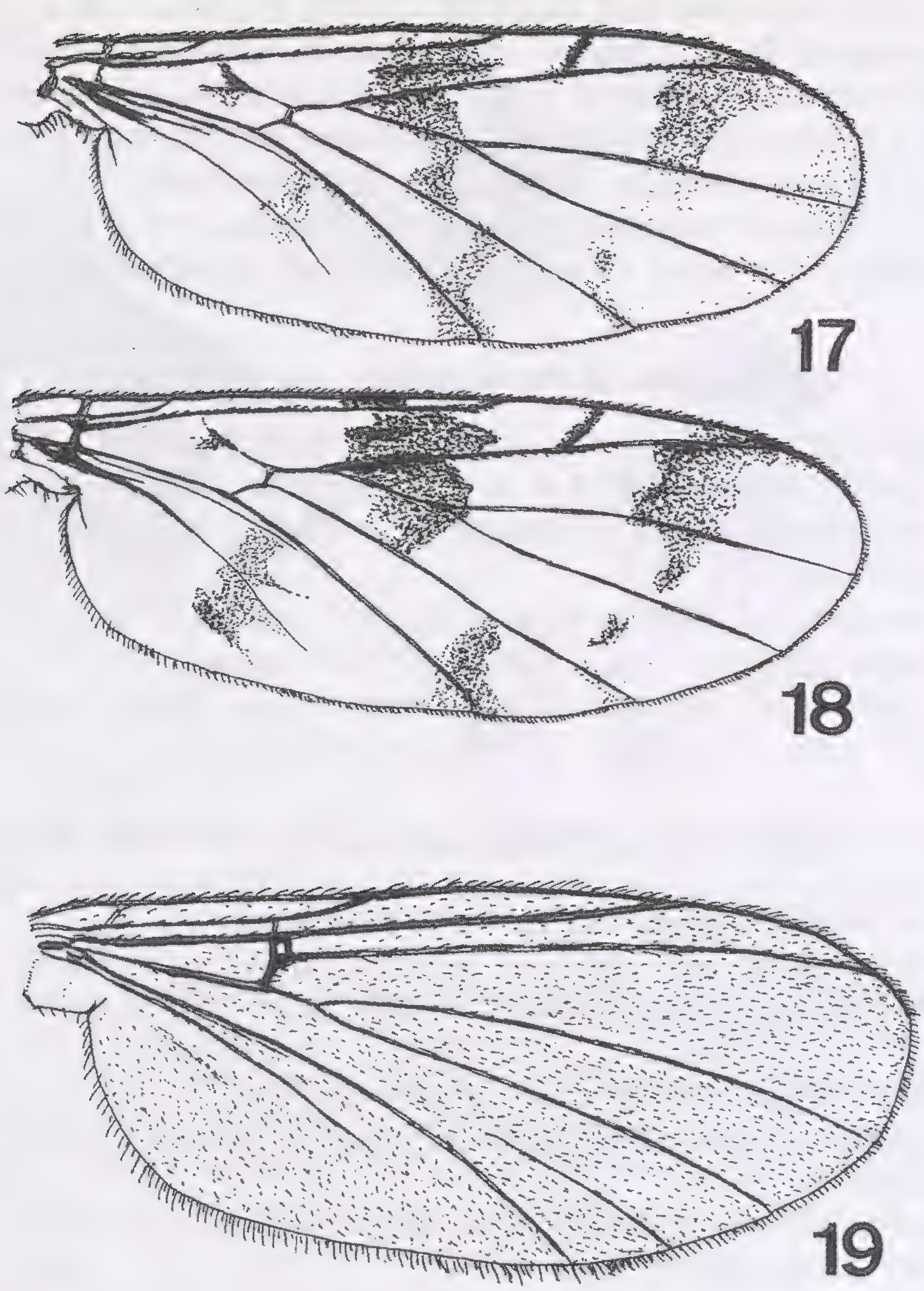
In the key to Palaearctic genera by Søli, Vockeroth & Matile (2000) *Lyprauta* runs to *Laurypta* Edwards, which is represented by two species in the eastern Palaearctic. *Laurypta* differs in having only a single spur on each tibia and in lacking the anal vein A_1.

Family Mycetophilidae

***Leia arsona* Hutson, 1978**

Material. The Netherlands, Zuid-Holland: 2 ♂, Westland, week 48/2005, ex *Peperomia* (Piperaceae); 11 ♂, 7 ♀, Westland, week 48/2005, ex *Peperomia* (Piperaceae); 1 ♂, 4 ♀, Westland, week 49/2005, ex *Peperomia* (Piperaceae); 1 ♂, 4 ♀, Westland, 22.xii.2005, ex *Gerbera* (Asteraceae); 2 ♂, 5 ♀, Zevenhuizen, 11.i.2006, ex *Gerbera* (Asteraceae).

Remarks. This species was described by Hutson (1978), when it had been found infesting root ginger of Brazilian origin at a warehouse in London previously used for banana ripening and it was included in the key to the British species by Hutson, Ackland & Kidd (1980). The only subsequent record from mainland Britain was by Halstead (2004), who recorded its appearance in a house in association with decayed bulb scales of a potted cultivar of *Hippeastrum* (Amaryllidaceae) that had originated from The Netherlands. It had previously been recorded there by Burger, de Goffau & Elenberg (1984), who found larvae in fungal mycelium between rotting leaves of



Figs 17–19. Male wings: 17–18, *Proceroplatus trinidadensis* (Lane) showing variation in markings: 17 (Kudelstaart), 18 (Westland); 19, *Sciophila fractinervis* Edwards.

Gerbera. Chandler (1994) reported that larvae had been found in a damp funnel of *Neoregelia carolinae* (Bromeliaceae) in Israel.

Hutson (1978) found material in the BMNH collection from South Africa, Kenya and St Helena, from which he concluded that it was a species of Afrotropical origin, but that it had been distributed elsewhere by commerce. Chandler & Ribeiro (1995) found that *L. fasciata* Storå, 1937, described from the Canary Islands, was synonymous but the name *L. arsona* stands as *L. fasciata* was a homonym of the Neotropical species *L. fasciata* Kertész, 1902. Consequently Chandler & Ribeiro (1995) recorded *L. arsona* as frequent in cultivated areas in the Canary Islands (including a banana plantation), Madeira and the Azores; they also recorded it from Israel, Malta, the Cape Verde Islands and the Channel Islands (Jersey). Toft & Chandler (2004), who included a whole insect photograph of *L. arsona*, recorded it as recently found to be established in gardens and industrial areas in New Zealand, where it had been collected as early as 1984. There it is associated with urban and port areas, has been trapped from compost bins and also reared from a fruiting body of honey fungus *Armillaria* species. The occurrence in numbers in the present material suggests that it has also been distributed by the horticultural trade.

Its present widespread distribution precludes any certainty as to its faunistic origin. Hutson (1978) did state that it belonged to a mainly South American species group so the possibility that it originated there cannot be excluded.

Genus *Sciophila* Meigen

Chandler (2006) provided a key, descriptions and figures of five South American species of this genus based on material in the BMNH collection. This work resulted from the discovery that the Chilean species *S. ocreata* Philippi, 1865 had been introduced into New Zealand (Toft & Chandler, 2004). The other four species dealt with by Chandler (*op. cit.*) were from Brazil and the material found in the Netherlands is considered to belong to one of these, *S. fractinervis* Edwards, 1940.

Sciophila fractinervis Edwards, 1940

Material. The Netherlands, Noord-Holland: 1 ♂, 1 ♀, De Kwakel, 2008, ex *Platycerium* (Polypodiaceae). The Netherlands, Noord-Holland: 1 ♂, Westland, week 46/2005, ex *Beaucarnea* (Nolinaceae); 2 ♂, Westland, week 46/2005, ex *Beaucarnea* (Nolinaceae).

Description. The material is in poor condition with most appendages missing, but in general agrees with the description of *S. fractinervis* by Chandler (*op. cit.*) and has been compared with the type material of *S. fractinervis*. One male has one complete antenna, showing that the flagellomeres are narrowly yellowish basally as in the type material of *S. fractinervis* and four legs, including one of each pair present. The body is mainly brownish and the legs entirely yellow. The wing (Fig. 19) of a male is figured for comparison with the wings of *S. cincticornis* and *S. ocreata* figured by Chandler (*op. cit.*). Male genitalia (Fig. 20) with tergite 9 (figured here *in situ*) less emarginate medially than is figured for *S. fractinervis* by Chandler (*op. cit.*). The single female examined has the basal four flagellomeres of one antenna remaining

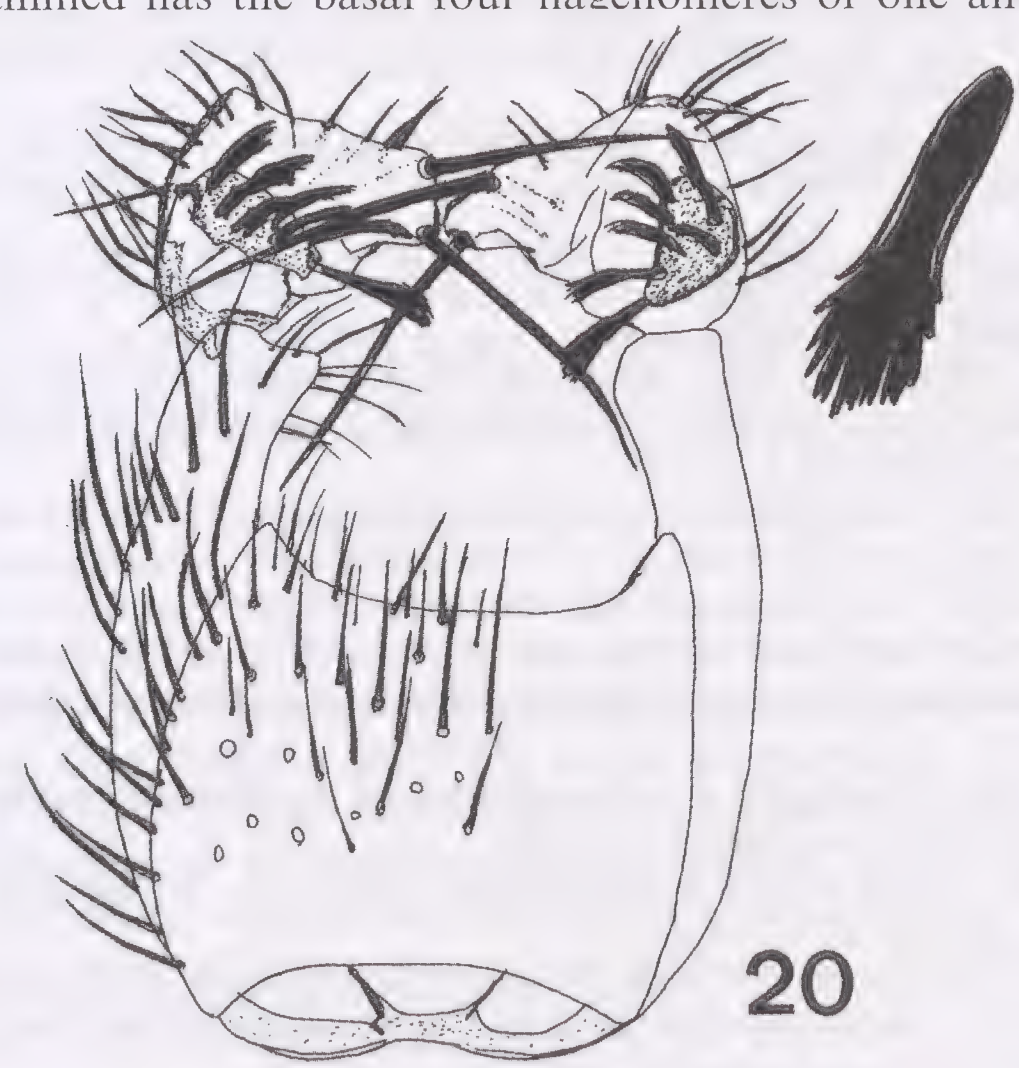


Fig. 20. Dorsal view of male genitalia of *Sciophila fractinervis* Edwards, with an enlarged view of a modified branched seta from the gonostylus.

and this has the base of each flagellomere yellow (from half of first flagellomere reduced to a third of the fourth flagellomere). It also has R_4 absent on one wing but normally developed on the other. Wing length 2.6–2.7 mm (male), 2.9 mm (female) (2.3–2.6 mm in male type material of *S. fractinervis*).

Remarks. There are some differences as indicated from the type material of *S. fractinervis* but this material is provisionally assigned to that species, pending the availability of better material for comparison. Among the known South American species, this species shares with *S. cincticornis* Edwards, 1940 the incomplete base to the anterior branch of the posterior fork (CuA_1). That species differs by having annulated antennae (flagellomeres yellow on basal two fifths to half), the gonostylus with a longer broader ventral lobe and vein R_4 (and consequently the radial cell) absent in all specimens examined. The female assigned to *S. fractinervis* here could be considered to be *S. cincticornis* on the basis of antennal coloration and the absence of R_4 on one wing. The presence of this vein may be unstable as it is in some *Sciophila* species from other Regions.

Acknowledgements

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A request for live material of *Parasemia plantaginis* from the UK. – I am currently investigating animal colouration, specifically polymorphisms associated with warning signalling. One focus of the study is the geographical variation shown by the Wood Tiger moth, *Parasemia plantaginis* (L.). I would be grateful if members of the British Entomological & Natural History Society could advise me where populations of this moth occur in the UK today. I wish to find live (egg-laying) females from which to breed from. I therefore require exact localities to visit which will remain confidential. If you are able to help, please contact me by email at the address below.

Professor Johanna Mappes, Department of Biological & Environmental Science, P.O. Box 35, FIN 40014, Jyväskylä, Finland. Email: mappes@byti.jyu.fi

COUNCIL REPORT 2008

As is customary this report starts with some statistics about the Council and the Society's year. The Council met at the South Place Ethical Society's Conway Hall on seven occasions during the year with, on average 15 members attending each meeting.

Four members, C. S. Barham, B. O. C. Gardiner, R. P. Knill-Jones and T. N. D. Peet completed fifty years of continuous membership at the end of 2008 and were elected Special Life Members. During the year the Council approved 30 applications for membership. However, 13 members resigned and it was necessary to strike-off 16 members for non-payment of subscriptions. Many of our resignations are as a result of members reaching a stage in life where they are unable to continue to take an active part in entomology. We regret that we have to report the deaths of six members during the year. The deaths include those of four Special Life Members representing some 239 years of membership between them. As a result of these changes membership stands at 841 at the end of the year, a net decrease of four on the previous year. We have suffered a net loss of around 6% of our membership since the subscription increase in 2006. We must now seek ways to recoup this loss which may be a challenge in these financially straitened times.

The Society maintained its programme of meetings, masterminded by Ian McLean, during the year. Four all day Saturday meetings were held. These were a joint meeting with Butterfly Conservation at the World Museum, Liverpool with talks about local and national moth recording, a fifth Coleopterists' Day at Dinton Pastures, a meeting hosted by the Hampshire County Council Museum and Archive Service at Chilcomb House near Winchester and the AGM meeting at the Oxford University Museum of Natural History. This was the first time that the AGM had been held outside London and required some changes to the previous format. It included a morning talk as well as the Presidential address and the popular behind the scenes tour of the entomology collections. These Saturday meetings have had a larger attendance than the evening meetings of recent years but there is still room for larger audiences and the all day meetings provide an opportunity to meet and share experiences with fellow entomologists as well as listening to the talks. We are grateful to the authorities at the World Museum Liverpool, Oxford University Museum and the Hampshire Museum Service for allowing us to hold meetings at these venues. We should also like to thank the local organisers, Guy Knight (Liverpool), Darren Mann (Oxford) and Chris Palmer (Hampshire) for their efforts in setting up these meetings. Our final indoor meeting of the year was the Brad Ashby Memorial Lecture, a joint evening meeting with the London Natural History Society. This year it was our Society's turn to host the meeting which was held in the Conway Hall where an excellent talk by Richard Jones was heard by a rather small audience. The usually good attendance by LNHS members failed to materialise on this occasion.

Nine workshop meetings were held at Dinton Pastures and ranged over a number of Orders, Trichoptera, Hymenoptera, Coleoptera, Diptera and Lepidoptera, as well as more general topics such as parasitoids, photography and making a collection of voucher specimens. As usual these meetings were well attended and appreciated. A total of seventeen people were involved with leading the workshops and we would like to thank them for their enthusiasm and their time in preparing and presenting these workshops.

Other commitments meant that our Field Meeting Secretary, Paul Waring, was only able to produce a limited meetings programme this year. Nevertheless 19 meetings were scheduled although, unfortunately, two had taken place before the

2008 AGM, Oxford Museum of Natural History

main programme was circulated. We apologise for the late appearance of the programme. In May, in addition to our normal programme, our President led a week long meeting to northern Mallorca and this is described in his report.

The Annual Exhibition at Imperial College is the climax of the year and the 2008 event was no exception. The inclement weather of the summer appeared to make little difference to the quality of members' exhibits and many noteworthy species were on show. Attendance was much the same as recent years with 162 members and 40 visitors signing the attendance book. Buglife, Butterfly Conservation and the LNHS contributed displays, the Natural History Museum brought some surplus cabinets and storeboxes for sale and Pemberley Books had a stand. A new Official Photographer, Joe Botting, travelled from Yorkshire to take up the challenge of capturing digital images of noteworthy species. We thank him for this and look forward to seeing the results in the *Journal*. The Exhibition was followed by the Annual Dinner which had a slightly reduced attendance and a considerably increased price. The attendance is now about half that of thirty years ago and even then it was reported that numbers were falling. We have resolved to find a new venue for the 2009 Dinner and our success will be judged in due course. If members have any ideas on alternative ways that the Exhibition could be rounded off with a social event please let us know. Again the Exhibition and Dinner were organised by Mike Simmons in the face, this year, of a number of obstacles put in his way by Imperial College. That nobody noticed is a tribute to Mike's organisation.

A new Christmas Card was produced this year depicting a Brimstone butterfly hibernating amongst ivy leaves. This was the third and, alas, the last design to be produced specially for us by Julie Tennent. Julie was determined to finish the card for us in spite of being seriously ill at the time. She had only a few more months to live.

We were able to send Julie a token of the Society's appreciation shortly after she completed the card and we understand this was much appreciated. Julie was the wife of our member John Tennent and we are particularly grateful to John for continuing to oversee the production and delivery of the card at such a difficult time.

At Dinton Pastures we have yet to resolve the possible transfer to the Society of the Country Park's exhibition room attached to our building. At present the exhibition space is being used by the Country Park for storage following the fire we reported last year. During the year the District Council agreed a development plan for the Country Park and fortunately chose the plan that impinged least on our activities.

We reported last year that a revision of the Society's bye-laws was in progress. A sub-committee of the Council was appointed to carry out detailed work which has now been completed and will be presented for approval to an early meeting of the new Council in 2009.

The Secretary represented the Society on the steering groups of Butterfly Conservation's Moths Count project and the Royal Entomological Society's National Insect Week. He also represented the Society on the Cockayne Trust committee. Mr LeRoy acted as the Society's observer at Buglife board meetings and Mr Miles attended the Lowland Heathland Conference in York to present the findings from the Society's Heathland Flies project. Mr Miles has also presented the findings of the project to several countryside organisations concerned with heathland management with positive outcomes. Mr Phillips and Mr Uffen continue to represent the Society on the executive and general committees of Invertebrate Link. Mr Stimpson represents the Society on the Patrick Roche Trust in Andorra. During the year the Society was consulted about the JNCC's proposals for the Quinquennial Review of the Wildlife and Countryside Act. We responded that we were in agreement with the proposals in so far as they affected insect species. In doing so we followed the Society's policy of avoiding adding further species to the schedules of the Act unless they were truly rare and in need of protection. Other organisations have proposed additions to the list of scheduled species but we do not think that these warrant inclusion on the grounds of scarcity and the practicability of habitat conservation.

This is my penultimate report on behalf of the Council. By the time of the next Annual Meeting I will have completed 20 years as Honorary Secretary and I think that will be an appropriate time for a change. Volunteers for the post are now being sought.

Finally the Council must record its thanks to all those non-Council members who contribute so much to the activities of the Society – the speakers, the field meeting and workshop leaders, the recorders at the exhibition, the exhibitors and the contributors to our *Journal.*

JOHN MUGGLETON

TREASURER'S REPORT 2008
FINANCIAL YEAR TO 31 DECEMBER 2008

This year has been comparatively quiet for the Society financially, business as usual with no funds required for publications or major projects. Grants paid have been modest and expenditure on new equipment has been under £2,000. Subscription and sales income have increased slightly and expenditure has been similar to previous years.

Statement of Financial Activities for the year ended 31st December 2008

	Unrestricted Funds	Restricted Funds	Endowment Funds	Total Funds 31.12.08	Total Funds 31.12.07
Incoming Resources					
Bequests and donations note 12	390	–	–	390	377
Subscriptions	14319	–	–	14319	13110
Investment Income	4582	3747	925	9254	12852
Trading Income note 2	2300	5264	–	7564	5016
Sundry Income note 3	1284	–	–	1284	1089
Total Incoming Resources	22875	9011	925	32811	33444
Resources Expended					
Direct Charitable Expenditure:					
Cost of Journal & Distribution	10654	–	–	10654	10302
Cost of facility at Dinton Pastures	–	3660	–	3660	5182
Members Meetings & Services	9162	–	–	9162	9050
Library & Curation	4439	–	–	4439	2454
Grants notes 10, 11	1195	–	–	1195	1288
Depreciation	2472	2210	–	4682	4748
	27922	5870	–	33792	33024
Other Expenditure					
Management costs	2610	–	–	2610	2936
Trading costs note 2	1506	3958	–	5464	2807
	4116	3958	–	8074	5743
Total Resources Expended	32038	9828	–	41866	38767
Net Resources before transfers	(9163)	(817)	925	(9055)	(6323)
Net Incoming/Outgoing Resources	(9163)	(817)	925	(9055)	(6323)
Gains & Losses on Investment assets					
Unrealised	(14626)	(38029)	(5850)	(58505)	(8906)
Net movement in Funds	(23789)	(38846)	(4925)	(67560)	(15229)
Fund Balances brought forward at 1st January 2008	98962	296453	23618	419033	434262
Fund Balances carried forward at 31st December 2008	75173	257607	18693	351473	419033

Balance Sheet as at 3lst December 2008

	2008	2008	2007	2007
Fixed Assets				
Tangible Assets		141621		144436
Investments		177894		236399
		319515		380835
Current Assets				
Stocks	7370		11819	
Debtors	7019		8998	
Cash at Bank and in hand	23278		26815	
	37667		47632	
Creditors: amounts falling due within one year	5709		9434	
Net current assets		31958		39198
Net assets		351473		419033

	2008	2008	2007	2007
Funds				
Endowment Funds – Hering Fund		18693		23618
Restricted Funds – Housing Fund	190285		217116	
Special Publications Fund	67322	257607	79337	296453
Unrestricted Funds:				
Maitland Emmet BENHS Research Fund	44852		60478	
General Fund	30321	75173	38484	98962
		351473		419033

Tangible fixed assets	*Leasehold Property*	*Fixtures & Equipment*	*Total*
Cost	£	£	£
At 1 January 2008	154736	70577	225313
Additions	–	1867	1867
Disposals	–	–	–
At 31 December 2008	154736	72444	227180
Depreciation			
At 1 January 2008	33150	47727	80877
Charge for year	2210	2472	4682
On disposals	–	–	–
At 31 December 2008	35360	50199	85559
Net book values			
At 31 December 2008	119376	22245	141621
At 31 December 2007	121586	22850	144436

Investments	2008		2007	
	M.V.	Cost	M.V.	Cost
Shell T & T	5819	1250	6319	1250
Unilever	8101	248	10564	248
M & G Charifund	61760	20238	91153	20238
Hendersons Bond	47659	58000	61770	58000
AXA Sun Life Bond	54555	56000	66593	56000
	177894	135736	236399	135736

Unrealised losses arising in the year are shown in the Statement of Financial Activities.

Funds

Analysis of net assets between funds	Tangible Fixed Assets	Invest-ments	Net Current Assets	Total
Endowment Funds:				
Hering Fund	–	18693	–	18693
Restricted Funds:				
Housing Fund	119376	70909	–	190285
Special Publication	–	43440	23882	67322
Unrestricted Funds:				
Maitland Emmet BENHS Research Fund	–	44852	–	44852
General Fund	22245	–	8076	30321
	141621	177894	31958	351473

The Society has received a donation of £390 in memory of the late Eric Gowing-Scopes. These abbreviated accounts are extracted from the Trustees' Report and accounts, a full copy of which has been lodged at Dinton Pastures and is available to members upon application to the Treasurer.

TONY PICKLES

However the performance of the investments on which we rely to augment our other income has been poor. Investment income received has fallen by over £3,000 and this has lead to an increase in our overall deficit in cash terms from £1,574 last year to £4,373. It should be noted however that this is still an improvement on 2006.

In addition to the drop in income our investments have suffered a large drop in market value as a result of the continued lack of confidence and the slide into recession which has affected world economies. I would like to make three comments about this. The unrealised drop in value of £58,000 is only on paper as long as we are not required to encash any of the investments. The investments are still above cost price and if it was not for changes in legislation which forced charities to show investments at market value we would have been following the more prudent reporting convention of cost and would have neither taken credit for past increases or suffered this current loss. It is impossible to predict the future performance of our investments; I am assured that the fund managers are well placed to take advantage of a future upturn but I am also told by others that the world will suffer a prolonged recession and we have a long way down to go yet. In these circumstances I believe we must exercise continued constraint in spending while not losing sight of our duty under the Charities Act to spend current income for the benefit of current members.

We remain financially able to deliver the membership the facilities and services they expect.

I wish to thank Roger Hawkins and John Flynn who have again carried out most of the arduous day to day transactions of the Society and our honorary auditors, Alec Harmer and Mark Middleton who have risen to the task as always.

A full set of accounts will be lodged at Dinton Pastures or may be obtained on application to the Treasurer.

TONY PICKLES

EDITOR'S REPORT 2008

Last year saw the printing of Volume 21 of the *British Journal of Entomology & Natural History* in four parts, in March, June, September and December 2008. The average issue was just under 70 pages in length. The last issue of the year was the only one to be delayed; this was because sufficient material for publication became available only after the editor returned from New Zealand in December. Even so, Part 4 went to press in late December.

This year we were able to publish two colour issues and these appear to have been well received according to members' comments. We were able to include colour photographs of some minute but pretty beetles in Derek Lott's article on saproxylic Coleoptera due to the kindness of Frank Köhler allowing us to use his electronic photo-library. The photograph of the chalcidid *Brachymeria tibialis*, even though the insect was pinned, was sufficiently good for Ian Beavis to recognise that he had discovered a second specimen of this species in the UK (note, in press). The colour photograph and article, supplied by Valerie and Philip Jewess, on a butterfly new to Kent *Vanessa itea*, a native of Australia, were literally turned round and sent to press in a day. Naturally I should also say that Richard Jones came up trumps again with his colour photographs taken at the 2007 Annual Exhibition.

Having been Editor now for several years it is evident that only a small proportion of members of the Society actually submit papers on a regular basis and I would certainly like to see more (new) members submitting articles to the journal in the future. This past year would have been an ideal opportunity to report on the effects

of the flooding we experienced in the preceding year across the Welsh borders and as far north as Hull. Yet apart from a field meeting report alluding to the wet weather no-one apparently has observed anything particularly unusual. Surely there must have been some major crashes in insect populations in these areas?

No Editor's report would be complete without thanks to other members of the team: to proof reader Adrian Knowles and the Indexers David Young and Roger Hawkins. I would also like to thank those other members of the Society who have offered their services as referees and compilers of the annual exhibition reports.

John Badmin

Curator's Report 2008

I mentioned last year that attention was being given to the accuracy of the collections. Arrangement according to the latest checklists had been largely achieved but there had otherwise been only limited revision since they had been received. In the case of the Coleoptera and Hemiptera the bulk of the collections had come to us 40 or more years ago and there have been many taxonomic changes and additional species during that period. Collections of these Orders are traditionally mounted on card but the pins to which these and associated labels are attached are often short or suffering from corrosion. It was perceived that revision would be facilitated if these specimens were staged on longer stainless steel pins but this would be a major task as about 80,000 specimens are involved. It was also considered that it would be useful if specimens were labelled with the current determination, pending revision by specialists. It was decided to seek funding for this work and after careful consideration of the time and resources required, an application for this was made to a charitable trust. This was unsuccessful and alternative sources of funding for this work are still under consideration.

This issue also affected the reorganisation of the Microlepidoptera into a single collection, which had reached the halfway point as reported last year. This was because the pins used for the polyporus strips on which much of the Emmet collection is staged were also often corroded at the point of contact with the cork drawer lining. Ian Sims kindly volunteered to restage where necessary the remainder of the Emmet collection. I also thank him for the work he has so far completed on this, which has enabled a further 6 drawers to be laid out, taking us up to the Scythrididae. Most of the families covered so far were staged but many of the larger micros in the Tortricidae and Pyralidae are direct pinned and staging of these to facilitate future handling will also be desirable, increasing the amount of work that will be necessary to improve the standard of the collection.

As mentioned last year there are still a large number of unnamed micro-moths, mostly in store boxes and identified to family level and any further assistance with these by specialists would be appreciated.

I am grateful to Tony Pickles for his continuing work on the Torstenius collection of Scandinavian Lepidoptera, of which part has now been returned in the new layout.

Several members have again donated valuable material to fill gaps in the collection. For such donations I am grateful to R. G. Booth, C. Curtis, R. Dickson, C. E. Dyte, D. Gibbs, A. J. Halstead, R. D. Hawkins, I. Perry, M. N. Smith and D. Young.

Although not directly related to the calendar year of 2008, I would like to mention our former member Bill Parker who died on 4 January 2009. Soon after joining the Society in 1969, he began to assist with curation, which he continued until our

first full year at Dinton Pastures in 1993. He was responsible for processing most of the Lepidoptera collections that were received during that period. It was also through Bill's previous contacts with the management at Dinton Pastures that the idea of the Society having a building in the Park was first proposed. We should thank him for having brought this possibility to our attention. The Society greatly benefited from his involvement over many years and a fuller obituary will appear in the journal.

Bill was a keen photographer and the Society has benefited from receiving a large number of photographic slides covering most Orders of insects, which are now being processed by Andrew Halstead. Bill didn't keep many specimens himself but did build up a reference collection of Lepidoptera, Coleoptera and Odonata from the Society's duplicates. Sadly this had become heavily infested with *Anthrenus* some years ago and, although I have been able to retrieve about 3000 beetles, only about 350 from several thousand Lepidoptera and none of the dragonflies survived unscathed.

I mention this now because other collections bequeathed to us have also come with some pest attack, although thankfully to a lesser extent. Making provision in a will is important, but is insufficient if the collector is for any reason unable to continue maintaining the collection. Such cases highlight the importance of arrangements being made to ensure that collections are conserved, while the collector is still able.

Some events at our building have continued to be well attended, although there has been a reduced attendance at some recent open days, highlighting how dependent these are on the small number of regulars being able to come. I would again stress that use of our facilities by more of our members would be welcomed.

PETER CHANDLER

LIBRARIAN'S REPORT 2008

My library duties this year have suffered, to some extent, as a result of my accident in 2007. Nevertheless, I have managed to keep on top of new acquisitions, adding around 300 such items to the data base and on our shelves. Much of this material has been the unfortunate result of the closure of Monks Wood, and the generous donation to us, by their librarian, of the John Heath Memorial Library. About one fifth of this donation remains to be processed but the bulk, including an impressive set of the distribution atlases produced and published by Monks Wood, are now available for loan by members. The closure of Monks Wood and other similarly august institutions recently is a great shame which, in these days of increasing national and international concern surrounding the loss of biodiversity, we can ill afford.

On a happier note, I am pleased to report that our journals are reaching the point where most of the binding of long runs of back-issues is complete. Soon it will just be a matter of keeping up with the binding of new acquisitions.

The big project for the next few years will be the restoration and repair of books and bound journal back numbers that have been damaged over the years of extensive use that members have made of them. For this project I intend to prioritise journals, but some of the more popular books requiring repair will also be tackled early on.

Lastly, in addition to those mentioned above I would like to thank Peter Chandler, Mike Fitton, Jonty Denton, Christopher Nissen, Malcolm Storey, Ian Wallace, Nick Riddiford and The Surrey Wildlife Trust for donations of books and journals during this period.

IAN SIMS

Bees, Wasps and Ants Recording Society (BWARS)

BWARS is primarily a recording society and publishes *Provisional Atlases* of the British aculeate Hymenoptera. It also produces a bi-annual *Newsletter* that in recent years has developed into something more closely resembling an entomological journal.

The highlight of the society's year is the AGM and workshop, usually held on the last weekend in September. In 2008 the meeting was held at the National Museum of Wales in Cardiff. A workshop session on the Saturday provided an occasion for both beginner and expert to identify and confirm specimens caught during the year, and included an opportunity to test a draft version of Michael Archer's new RES key to Vespidae and other small wasp groups (Tiphiidae, Mutillidae etc.).

After the AGM on Sunday, members' talks covered a range of subjects. Michael Kuhlmann talked about his studies on bees and climate in South Africa. Jeremy Early told us about his involvement with aculeates and their photography following the discovery of their use of root plates for nesting. Apart from making, and photographing, a number of useful observations on the behaviour of individual species, he has also obtained photographs of a large range of aculeate species, many of which were published in *Bees of Surrey* (written by BWARS member David Baldock). Cathy Fiedler described her experiences working as an apprentice with the British Trust for Conservation Volunteers, during which she learned about aculeates at Liverpool Museum and applied this knowledge in a contribution to research on *Colletes floralis* on Islay. Scotty Dodd and Nikki Gammans, from the Surrey Wildlife Trust, told us about their work on *Formica rufibarbis*, Britain's rarest ant. The species occurs as a couple of nests in Surrey and also on the Isles of Scilly. Surplus mated queens from Scilly were taken in to captivity to produce new colonies. Initially these were kept by the Zoological Society of London at Regents Park, and subsequently some colonies were released into sites in Surrey. Matt Heard gave a presentation on the effects of restoring areas of bumblebee forage plants to intensive agricultural landscapes. The session concluded with members' slides.

During the year the membership of the society passed the 400 mark and saw the highest number of new members at 57. Many of the new members were attracted through the website – *www.bwars.com* – which should be the first port of call for anyone interested in aculeates in Britain.

Graham A. Collins.

Dipterists forum Report

This was another rather exciting year for Dipterists Forum, packed full of activities. Early in the year the webpage was revamped and has evolved rather rapidly. It can be found at *www.dipteristsforum.org.uk* and is forum based, which means that everybody can contribute to topics. This has led to many discussions over the year and progress with some recording schemes. Members can also download some draft keys and help in their development.

The year started with two very interesting workshops in Preston Montford from 7–9 March. The beginners' course was led by Stuart Ball and Roger Morris, while the course for advanced dipterists on Tachinidae was led by the Recording Scheme organisers Chris Raper and Matt Smith. The beginners commented very positively on their course and many joined Dipterists Forum. The advanced course included testing a draft key based on Belshaw's RES key, but with some revised couplets. It included all new species and some that are expected to turn up in the UK. The key

makes identification of this group much easier since it contains more confirmatory characters than the original.

The Spring Field meeting from 10–11 May was in Lincolnshire. It was very successful and, unusual for 2008, the weather was good. Nine people participated.

This was followed by a very well organised Summer Field meeting at Glenmore Lodge in the Cairngorms. Roger Morris, the field meeting secretary, had chosen this wonderful venue within Rothiemurchus forest. In total over thirty members and friends participated, although some could not stay the whole week; these included seven coleopterists, Andrew Halstead working on Symphyta and one non-entomologist. The Scottish dipterists, all members of the Malloch Society, helped make this meeting successful by providing local knowledge and guidance. Iain MacGowan reported on his work on montane Diptera and showed some participants the work in creating artificial breeding sites for *Callicera rufa*, a rare syrphid. Ellen Rotheray, Graham's daughter, gave us a fascinating presentation on her PhD work on saproxylic hoverflies. Many of us were concerned on hearing that *Hammerschmidtia ferruginea*, a hoverfly dependent on fallen trunks of mature aspen in the right condition, exists on only five sites in larger populations. It is exciting to hear how this fly can be encouraged by creating habitat and we are hopeful that Ellen's work might help to save it. However, we sadly learnt that *Blera fallax*, another very spectacular large hoverfly is more endangered in the Caledonian Pine forest and we may lose it. A personal highlight for me was to see a live specimen of *Hammerschmidtia ferruginea* at a typical site, thanks to Ellen. Despite less than ideal weather conditions we managed to collect every day and records included some typical Scottish rarities including *Laphria flava*, which caused some excitement. The scenery was fantastic and we were able to collect around the Lodge.

During the autumn meeting in Abergavenny, 10–15 October, the participants stayed in a bed and breakfast and again enjoyed rather better collecting weather than during most of 2008. In addition to Diptera, Coleoptera and fungi were collected, and a new suction sampler, acquired by the Diptera section of the Natural History Museum, London, was brought into action. It was reported that participants enjoyed the social company as much as the venue and the different sites visited.

The Dipterists' Day and AGM at the National Museum of Wales Cardiff, 22/23 November 2008 was well attended. Adrian Plant, curator for Diptera at the museum, provided much help and also organised a much appreciated dinner in an Italian restaurant – and this despite an international rugby match in town! His talk was on the changes in the systematics of Empidoidea and the progress of the Empididae and Dolichopodidae Recording Scheme. The latter covered various distributional patterns, but also species associated with different soil types including calcareous and peaty substrates. The next talk by John Manlove on Forensic Entomology included the first case a thousand years ago in China. He went on to describe the use of Calliphoridae and Phoridae (both Diptera) in determining the post-mortem intervals of corpses and some of the limitations. David Clements reported on the results of the Conopid Recording Scheme and tried to encourage members to deposit their flies in museums, in particular the rarer species. He reported that there is evidence that the behaviour of bees changes when they are parasitized by conopid larvae. This talk was followed by a short presentation by Stuart Ball on long-term recording projects in two gardens, namely a Malaise trap run by Dr Jennifer Owen in her garden for 30 years and a transect walk by Alan Stubbs in his garden since 1991. The results showed a decline of hoverflies in both gardens.

During the AGM John Ismay stepped down as chairman and handed over to Stuart Ball. Jon Cole retired from his post as treasurer after 14 years; Peter Chandler

has edited Dipterists Digest and the Checklist for many years and includes in this regular updates to the 1998 Checklist, which he also edited, and in 2008 could announce the 7000th Diptera species for the British Isles. Both were awarded Honorary Life Memberships for all their hard work. It was announced that the Culicidae Recording Scheme has been revived by Jolyon Medlock, while Steve Crellin took over the Sepsid Recording Scheme. All Diptera Recording Schemes and Study Groups can be found on the Dipterists Forum webpage and are mentioned in the Bulletin.

Two excellent Bulletins and Dipterists Digests were published with a lot of interesting information; copies of these can be found in the library in Dinton Pastures.

The membership has increased by a net gain of 25 new members to a total of 330 members on 28 December 2008 thanks to the efforts of Mick Parker (membership secretary), Judy Webb (publicity officer) and many other committee members.

The official BAP process has seen some further actions being finalised, which will be incorporated in the webpage. Dipterists Forum has launched a scheme called 'Adopt a Species', which will encourage entomologists to work on one or more BAP or other species with status, e.g. RDB or Notable. This scheme does not aim at single species conservation, but is rather meant for people who want to help fill in some of the many gaps in knowledge. This should help workers to give advice on habitat management for Diptera.

BARBARA ISMAY

PRESIDENTIAL ADDRESS
Part 1: REPORT

PETER J. HODGE

8, Harvard Road, Ringer, Lewes, E. Sussex

My predecessor suggested I should start writing this address well in advance of the March AGM and being a person who always leaves things until the last minute I was pleased to receive this advice.

Like other Presidents I thumbed through several past addresses, not just in search of inspiration but also to avoid undue repetition. Kenneth Williams was the master of this art in the Radio 4 programme "Just a Minute" and by sheer coincidence I discovered that his namesake is a member of this Society!

You have heard the annual reports from our officers and it is pleasing to know that everything is functioning smoothly.

Now I want to say a few words about conservation, past and present, because it is this that is likely to influence the way our society works in the years to come. Scientists constantly remind us that species are becoming extinct faster now than at any time in recorded history and if this is true then action must be taken soon if we are to reverse this trend.

Whilst visiting London recently I paused briefly to observe people going about their daily business. In many respects the city, with its intricate network of streets and underground railways, is like a giant ant's nest. Everyone appears to be heading in different directions, without any hint of interaction, but in reality they are all part of the same complex machine.

As a breeding species we have become extremely successful, but there is a price to pay in that we are causing an imbalance of nature that is threatening to exterminate thousands of creatures with which we share the limited space available. Of course we cannot continue to expand our population indefinitely and we frequently hear of predictions that in centuries to come there will be a catastrophe that will wipe us out. If this does happen then wildlife could flourish once again. That said, like the current turmoil in the World's financial markets, we all hope everything will resolve itself, but the truth is no one knows for certain what might happen in the future.

Habitat loss is not new, even 150 years ago there are literature references to the decline of East Anglian fenland species caused by land drainage. London was expanding rapidly too. A google search for "Hammersmith Marshes" produces just one result, stating that the rare water beetle *Hydrochara caraboides* was much more widely distributed in the 19th century, being particularly well recorded from this site. There should be no need to remind you that this species is no longer present there!

While entomologists of years gone by were content to focus on collecting or discovering new species, the trend nowadays is to pay much more attention to conservation, and rightly so too.

This Society may not have the power to influence environmental change on a global scale, but closer to home we can help to conserve nature by offering to share our expertise. As an example, we are currently exploring ways of forming a partnership with Buglife, although as yet we do not know what our role might be.

We all like to see the data we send to recording schemes or local record centres put to good use and it is pleasing to know that government bodies are at last seeking advice from invertebrate specialists when assessing planning applications for changes in land use. Their decisions are not always to our liking but then nothing in this world is ever perfect.

We often regard our country as the leader in the promotion of insect conservation, but in fact there are groups actively recording insects in many foreign countries too. The Entomological Society (Société Alsacienne d'Entomologie) in the Alsace region of eastern France whose members have produced a very useful series of Coleoptera distribution atlases is just one example and I would like to explore ways of interacting with such organisations. How many members have collected or recorded insects while on holiday abroad but not known where to send their data? Quite a few I suspect!

I would also like to see more overseas field meetings advertised in our programme. The seeds have already been sown with three successful expeditions to Belize in 1996, 1997 and 1998, all led by Paul Waring, followed by a trip to Slovenia in 2003, led by Mike Wilson. This year I am pleased to report that a link has been established with the Parc Natural de s'Albufera in northern Mallorca and in May 2008 I led a group of seven entomologists for a week-long survey in the reserve, concentrating on the most poorly recorded groups, Coleoptera, Hemiptera and Hymenoptera. There was also a spider specialist amongst us. Although this partnership was something of an experiment, it is hoped it will pave the way for further visits in the future. However, these trips are complicated to arrange and more volunteer leaders are needed if they are to continue.

Back in the UK, a number of field meetings were organised by several enthusiastic members. National moth night on 7th June coincided with a brief spell of fine weather and the meeting I attended at Lewes, in partnership with the Sussex Moth Group, resulted in the addition of 61 species of moths to the Railway Land Nature Reserve's database.

It is our tradition to thank our officers for their hard work during the year and I make no apology for repeating what has been said at previous AGMs. That the Society is able to survive without employing a single paid member of staff is a remarkable achievement and it is vital that these dedicated volunteers are acknowledged for giving up many hours of their precious time. Without them the Society would not function in its present form, indeed, only after serving as President have I begun to understand the complexity of business going on behind the scenes.

I would like to thank our Secretary John Muggleton for keeping our affairs running smoothly, as well as taking the minutes and skilfully guiding me through my Presidential roles. I have needed a prod on several occasions but John is always close by to help when things go wrong. Thanks go to our Treasurer, Tony Pickles, who had the awesome task of reassuring Council that our finances would remain secure during the current financial crisis; Roger Hawkins, Assistant Treasurer, who deals with annual subscriptions and also helps with editing our journal indexes, always paying special attention to fine detail; David Young, Membership Secretary, in charge of recruitment and registration of new members and John Badmin, Editor of our journal, who has a difficult job at the best of times. Next I thank Gavin Boyd, who carries out the important task of sales secretary and always keeps Council informed of our income from sale of publications down to the last penny. Our Distribution Secretary, Andrew Halstead, must be thanked for ensuring that member's journals are dispatched on time. For management of the Pelham-Clinton building I have to thank Martin Albertini who is constantly on emergency standby as well as dealing with day to day problems. I thank Ian Sims, our Librarian, who oversees members' loans and ensures that our books and journals are in good order; Peter Chandler, Curator, who is responsible for ensuring our collections are kept up-to-date and preserved in a pest free environment; Ian McLean who co-ordinates indoor meetings and retains the wonderful job title of Lanternist; Mike Simmons for arranging the annual exhibition; Paul Waring, Field Meetings Secretary, for co-ordinating summer field meetings and Tony Pritchard, our webmaster, for maintaining the on-line information. Life in the 21st century is becoming increasingly dependent upon computers and the internet is likely to become even more important as the digital age progresses. Finally, we must not forget the remaining members of Council who collectively make an important contribution to the Society.

Next I will turn to membership. With our numbers either static or gradually declining in recent years, we need to consider ways of attracting new blood. Historically a high proportion of our members live in the south of England, but now it is essential that we look forward and seek to broaden our horizons. Members are very sparse in Wales, Scotland and northern England, so there is a special need to target these areas. Some might argue that all our indoor meetings are held in the south and whilst this may have been true in the past, every effort is being made to arrange regional meetings in other parts of the kingdom.

Although not a great distance from our headquarters at Dinton Pastures, our meeting with the Hampshire Museums Service at Chilcomb House near Winchester on 26 April was extremely successful and a variety of presentations, skilfully arranged by head of entomology, Chris Palmer, were thoroughly enjoyed by all. A guided tour of the museum's insect collections completed a splendid day.

The annual Brad Ashby Memorial Lecture on 16 September, in conjunction with the London Natural History Society, featured Richard Jones presenting an extremely entertaining talk entitled "How to be a (Curious) Coleopterist" in which he recalled the humorous side of past collecting trips, many of which were in East Sussex in the

company of yours truly back in the 1970s. This light-hearted look at entomology was much appreciated by all who attended.

Next it is my sad duty to report deaths and share a few memories of members who are no longer with us. Nine deaths were reported to me during my year as President as follows:

Brian West from Dartford, Kent died on 24 August 2008 aged 89. He was a Special Life Member having joined the Society in 1947. He was British Macrolepidoptera Recorder at our annual exhibitions during the early 1990s and kindly bequeathed his microscope to the Society.

Eric Classey died on 7 September 2008 aged 91. He joined in 1936 and was one of the last few pre-World War 2 members. Eric served as President in 1952 and was made an Honorary Member in 1978. Interested mainly in Lepidoptera he will be remembered for his generous nature and especially for his willingness to help young entomologists. In 1950 he founded the Entomologist's Gazette and subsequently became a successful publisher and dealer in second-hand books. He was an extraordinary character and will be sadly missed by all who knew him.

Neil Robinson from Cumbria died on 7 October 2008. He joined the Society in 1995 and made an important contribution towards the understanding of wood ants. He also published local lists of aculeate Hymenoptera for the north of England.

John Fenn from Thetford in Norfolk died on 2nd December 2008. He joined the Society in 1972 and was interested in Lepidoptera and Coleoptera.

Giles Roche from Labuan in Malaysia died on 8 December 2008. He was a Special Life member, having joined in 1953 and served as our President in 1964. Interested in aculeate Hymenoptera, he bequeathed his microscope and some other equipment to the Society, for which we are most grateful.

Deryk Frazer from Boxley in Kent died in December 2008 aged 91. He joined in 1948 and was a Special Life Member interested in Lepidoptera. Deryk was author of the second New Naturalist book on reptiles and amphibians. He was chief Conservation Officer for England and later chaired the International Conservation Section.

Ernest Lewis died on 2 January 2009. When he retired he moved from his previous home at Warlingham, Surrey to Chagford in Devon. He joined the Society in 1947 and was a special Life Member. Ernest had a lifelong interest in Coleoptera, especially the family Phalacridae.

Mike Majerus from Cambridge died on 26 January 2009. He joined in 1970 and although his interest is recorded as Lepidoptera he will be especially remembered for his work on genetics and publications on ladybirds. It is noteworthy that he involved the public in recording the distribution of the Harlequin and other ladybirds and he is largely responsible for the recent popularity of these attractive beetles.

Finally I have to announce the death of Julie Tennent shortly before Christmas. She will be remembered for the beautiful illustrations she designed and painted for several recent Society Christmas cards.

I now invite you all to stand and join me in a moment's silence in their memory . . . . . Thank you.

When Norman Hall telephoned me on Guy Fawkes Night in 2006 I correctly guessed exactly why he had called. Did I really want to take on the job of BENHS President? Well, after a moment's thought my answer was without hesitation "yes" and I have no regrets about that decision.

It has been a great honour to be President. My year in office has slipped by all too quickly and it is now almost time to hand over to my successor.

BRIAN ELLIOTT
BENHS President 2009–2010

In common with recent past Presidents of our society, I too can only claim amateur status and in my case my interest in Lepidoptera goes back a very long way, indeed to being only four years old. At this age, the catalyst was the presentation of a jam jar containing a quantity of Cabbage White pupae given to me by a much loved aunt, herself a keen gardener/naturalist. Right on cue, one immediately began to eclose before my wide open eyes. I was hooked!

I am farm born and bred and of course this gave me ample opportunity to roam the countryside in my early formative years in the days before the advent of mass chemical modification of the natural environment. I am talking about experiences such as lifting a forkful of hay at haymaking and having half a dozen noctuas flee from their hiding place. Everywhere on the farm, my interest was being reinforced.

Education then began in earnest in common with most people as secondary school beckoned. This in my case was Chesterfield School and entomology then began to take a back seat until one day, a biology master, noting my interest, gave me a prospectus and address list of the AES. There were other people interested as well!

A holiday in Brighton at sixteen years old to stay with an old school friend, accompanied by that address list, resulted in my knocking on the door of an old "South London" member, Len Savage who lived in Hove. This was fortuitous since he became my entomological mentor. After getting to know his friend, Dr. Jack Banner, I was introduced to the wonders of the mv light and a portable generator. Nights spent on Shoreham beach were magic to a boy from Derbyshire. More visits over the next two years introduced me to the wonders of sallow shaking and sugaring.

Alas, all this came to an abrupt end in 1952 when I was called up for military service and served my time in the then Free Territory of Trieste. At that time, it seemed a very distant place. However, there were opportunities to observe Lepidoptera and *Daphnis nerii* sticks out in my mind as does the memory of the depredations of *Lymantria dispar*.

A return to England in 1954 led to an entomologically blank period in my life as intense studying as well as holding down a day job finally led to admission to Sheffield University to read Dental Surgery. As part-time jobs took up any spare

moments, there was no entomologising apart from a brief afternoon in Derby in 1960 where I joined the Derbyshire Entomological Society and a visit to the AES Annual Exhibition in the same year. Here I met Eric Classey who was working up his book business and he successfully sold me two volumes of Seitz's *Macrolepidoptera of the World* – after plying me with much scotch and giving me a large cigar. Typical of him, he would not accept payment until I could afford it, which was a considerable time later.

It was 1961 and qualification before I could consider giving Lepidoptera some attention, though then marriage and family commitments intervened so interest continued in a low key, but I still visited Len Savage and he took me up to London for my first visit to the South London Entomological & Natural History Society Annual Exhibition in 1966 which was at Burlington House in those days.

This visit culminated in me joining our society in 1968 and making new friends. One in particular, Tony Harman came to live in Chesterfield where I practised and together, we were a mutual stimulus over the next few years. The next development was a close friendship with Bernard Skinner, Dennis O'Keeffe and Dick Chatelain. This was particularly so after 1976 when Tony left Chesterfield to take up a teaching post in Kent.

In the seventies, I achieved Principal status so was able to take time off to develop my interest further and I ranged over pretty well the whole of the British Isles. It was during this period, that I was elected President of the Derbyshire Entomological Society (1973–1976). After I had completed that term, I thought my committee days were over.

An old Derbyshire hand suggested to me years ago that all keen Derbyshire lepidopterists gravitated south eventually and so it was for me, when upon retirement, I moved to Hampshire in 1999. This suited my dear tolerant wife who had family in the area.

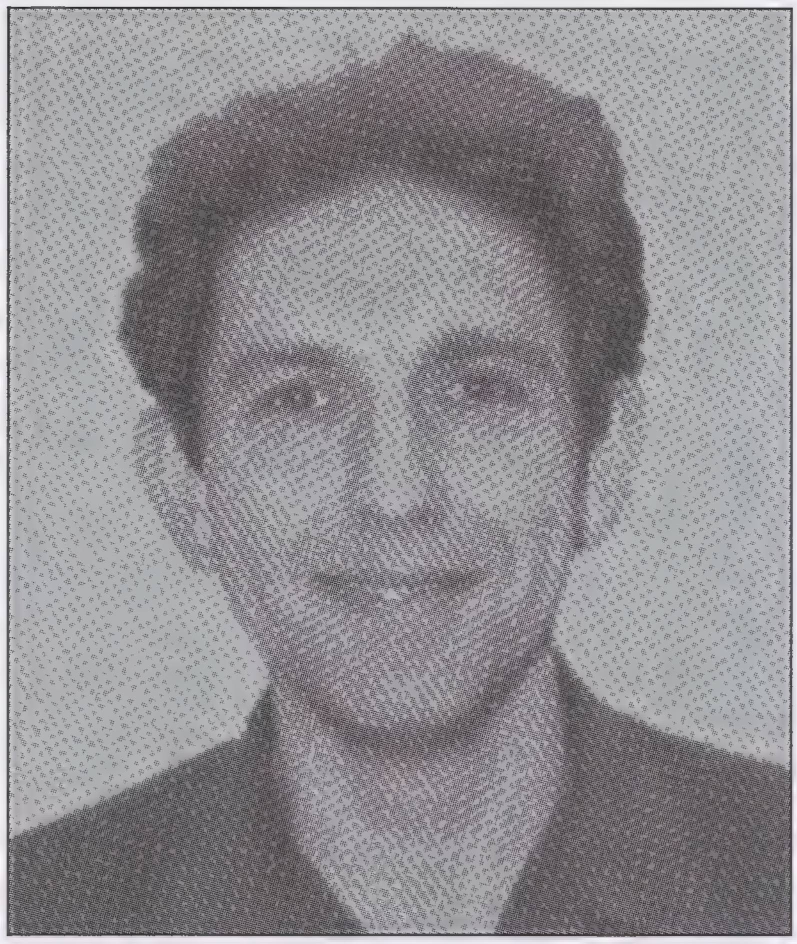
During the eighties, I did fall under the influence of those old Brit. Ent. Soc. hands, Richard Fairclough, whose enthusiasm for the microlepidoptera knew no bounds and Teddy Pelham Clinton's knowledge of them whenever I spoke to him. This was a challenge that I had to take up – the breeding and successful identification of these fascinating insects. And so it has been ever since.

It was quite a shock to be invited to become the President of this great Society and though not being naturally committee oriented, I hope that I will be a safe pair of hands.

Migration of Painted Lady *Cynthia cardui* in Kent, May 2009. – I first observed adults of the Painted Lady *Cynthia cardui* (L.) this year in Kent on 19 May – two individuals along the cliffs at Warden Point, Sheppey. These must have been among the first migrants to arrive during the current wave as on the previous day I had visited Dungeness where the weather was far from pleasant – cool, showery and with a stiff easterly wind and no butterflies to be seen. In the afternoon the weather began to improve slightly and the wind changed to a more southerly direction and it is probable that this is when the butterflies first reached landfall. Appreciable numbers of *C. cardui* were observed during the rest of the week, and it was apparent that a migration event was in progress, though nothing unusual.

However by 24 May at least 100 individuals were counted whilst out walking. Peak numbers of *C. cardui* were noted in the garden during the afternoon of 25 May – averaging 10 individuals per min over a front of 40m at 14.00h and reaching as high as 24 per min between 15.00–16.00h, all moving in a northerly direction. The clouds, which had been gradually building up from the south covered the sun by 16.15h and butterfly numbers dropped to 1–3 per min, with some individuals settling or even flying south for a while. Numbers dropped to zero when it rained. Similar numbers of *C. cardui* (8 per min.) are flying through at the time of going to press (28 May). – JOHN BADMIN, Coppice Place, Selling, Kent ME13 9RP.

OBITUARIES



MICHAEL EUGENE NICOLAS MAJERUS
1954–2009

Professor Mike Majerus, the second son of Fernard and Muriel Majerus, was born in London on 13 February 1954. His interest in Lepidoptera and ecological genetics was sparked by reading E. B. Ford's post-war classic books on Moths (New Naturalist) and Ecological Genetics. By the age of 10 he was recording moths with his own light-trap.

He was educated at Merchant Taylors' School in London and graduated in botany and zoology at Royal Holloway College in 1975. He remained at the university to complete a doctoral thesis on the causes and effects of larval polymorphism in the Angle Shades moth *Phlogophora meticulosa* (1979, 1980 & 1983). Larvae in the first few instars are bright green whereas those in the final instar (like many other species) vary in colour from green to brown, yellow to reddish pink. This work led naturally to studies on colour polymorphisms in other Lepidoptera and elytral patterning in ladybirds.

After his PhD, he was appointed as a research demonstrator at Keele University and then moved to Cambridge in 1980 starting as a research associate in the Department of Genetics. He became a University Lecturer in 1987 and a Teaching Fellow at Clare College in 1991. He then rose up the academic ladder with a Readership in 2001 and became Professor of Evolution, 2006–2009. His research interests are best described by the keywords linked to his website: evolutionary genetics, ecological genetics, polymorphism, melanism, Peppered moth, *Wolbachia*, male-killers, reproductive strategies, reproductive costs, ultra-violet patterns in insects, sexual selection, Lepidoptera and Coccinellidae. He excelled at lecturing and thoroughly enjoyed talking to undergraduates and postgraduates alike on the wonders of the insect world. He was easy to approach and radiated passion about his subject. I suspect he was one of those on the BBC's contact list as he was often to be heard on radio talking about evolutionary biology and in particular about the occurrence of the harlequin beetle in the UK and its potential effects on native ladybirds.

Many of his studies have centred on the Peppered moth *Biston betularia* which provides irrefutable scientific proof of biological evolution through the Darwinian mechanism of selection. Some of this work was carried out in his own spare time as

he was one of those lucky enough, as many biologists are, of mixing work with pleasure. A casual observation of insects in the field on holiday was just as likely to initiate a research project as one derived from meticulous studies in the laboratory. He was well aware and more than most of the need to test hypotheses in the field where confounding factors are far from easy to control.

His early work at Cambridge focused on the biology of ladybirds, investigating the genetics of female choice (1982, 1986a, b), colour patterning (1987), habitat and host plant preferences (1991) and geographical distribution in the UK (1990). This focus on ladybirds with lots of interesting observations on British species led Mike to introduce a Newsletter and then a mapping scheme for ladybirds, known as the Cambridge Ladybird Survey. This was intended to complement the existing BRC Coccinellid Distribution Mapping Scheme started by John Muggleton of this Society. This blossomed probably beyond his greatest expectations and was adopted enthusiastically by schools, Wildlife Trusts and many members of the public resulting in a vast increase in our knowledge of the distribution of ladybirds in the British Isles. Even seasoned old coleopterists were astonished by the amount of new data coming in. It is true to say that a considerable number of younger coleopterists today were introduced to beetles via the recording scheme. The fruition of all this work was the publication of his New Naturalist book *Ladybirds* in 1994.

Mike was also very interested in reproductive strategies and mechanisms of sexual selection as a result of his behavioural studies on ladybirds. Ladybirds, like many other species studied in detail, have a number of subtle ways of influencing mate choice and offspring sex ratios (1986). Some of this work was done in collaboration with Greg Hurst (see review, 2005) and resulted in the publication of *Evolution the Four Billion Year War* in 1996 and *Genes, Bacteria and Biased Sex Ratios* in 2003.

Of course Mike loved studying moths and the culmination of his studies on British and other species was brought together in his second New Naturalist volume published in 2002. The title of the book just had to be the same as E. B. Ford's earlier volume – *Moths*. This assembled a lot more new data on British moths and also highlighted how little we know even today about the biology and ecology of our native fauna in the wild. He also had a life long interest in the Peppered moth and conducted numerous experiments on its various colour forms. In the early 1990s he was commissioned by Oxford University Press to publish *Melanism:Evolution in Action* (1998) to critically appraise the phenomenon of melanism and to celebrate the publication of Kettlewell's ground-breaking book on the subject published 25 years earlier. Unfortunately a review of his book in *Nature* implied that the message from the research on *Biston* was a flawed example of Darwinian evolution and that 'for the time being we must discard *Biston* as a well-understood example of natural selection in action'. This wording was picked up by the media and publicised widely. This was very unfortunate as a reviewer of the review AND the book concluded 'If I hadn't known differently, I would have thought the review was of some other book'. But the cat was out of the bag and 'the story' was grist for the creationists' mill. Then came the publication of *Of Moths and Men: An Evolutionary Tale, Intrigue, Tragedy and the Peppered Moth* (Hooper, 2002).

Despite the book being strewn with errors, misrepresentations and misinterpretations, Mike set about setting the record straight by re-explaining the *Biston* story and conducting many additional experiments to clarify the selection process. For example he showed that (i) Peppered moths do settle naturally on tree trunks but prefer to settle on the trunk and branches higher up the tree, (ii) bats eat *Biston* moths but do not discriminate between colour forms when flying at night, and (iii) wild birds appear to preferentially predate the melanic form under unpolluted

conditions (2005). Some of these observations in the field took 25 years to accumulate. The latest results of his *Biston* studies were published this year (2009). Although the apparent controversy arising from his book was not of his making, I am sure this all helped to crystallise his thoughts and the design of his subsequent experiments and we are the beneficiaries of his hard work. I wonder just how many times he climbed up the trees in his garden in search of Peppered moths resting in the canopy to observe where they rest naturally. I was privileged to hear Mike deliver his presentation on 'The Peppered Moth' at the Royal Entomological Society's Symposium on Insect Evolutionary Ecology at Reading University in 2003: it was the best presentation of the week – witty, erudite and well illustrated. I know he enjoyed it a lot too.

Mike participated in numerous societies. From an early age he was a member of the Amateur Entomologists' Society and was elected President in 2006–2009. He was also a member of the British Entomological & Natural History Society and a Fellow of the Royal Entomological Society.

John Badmin

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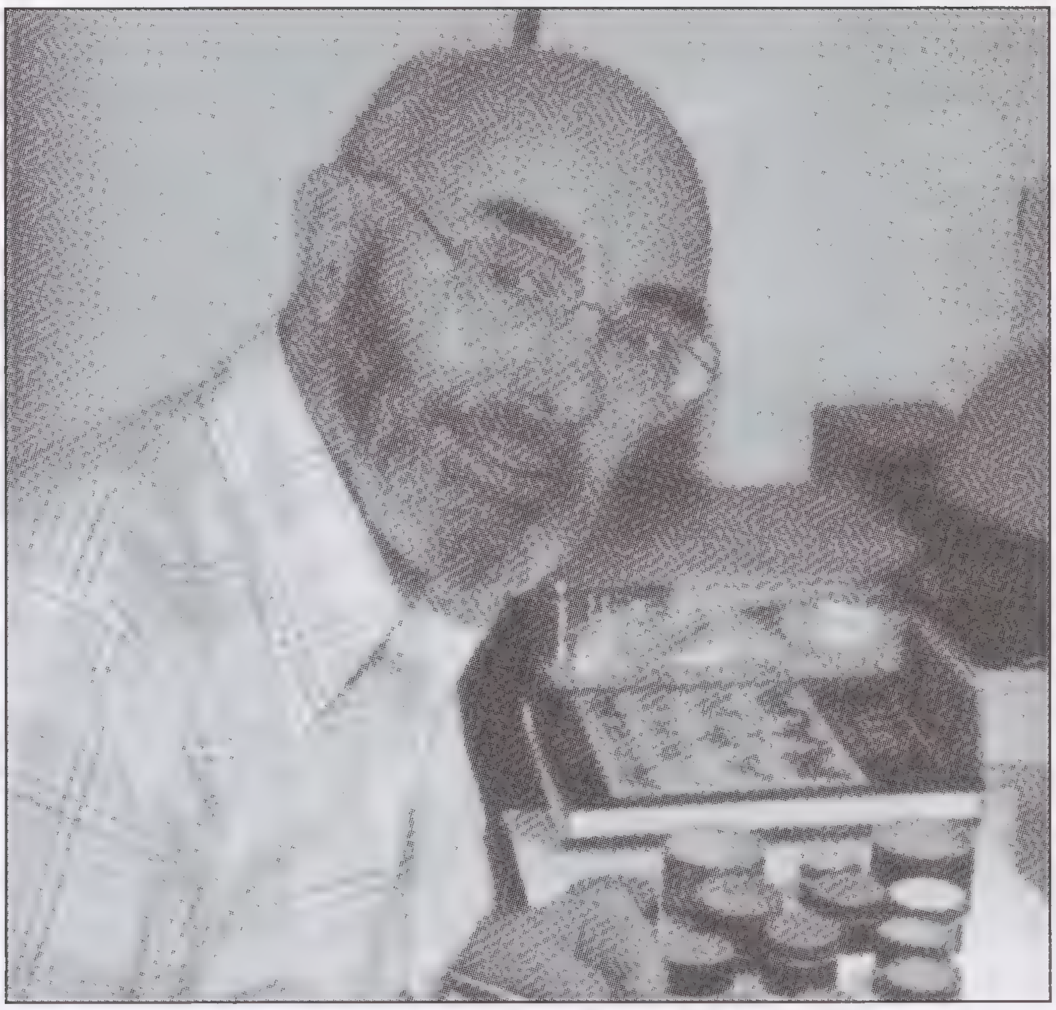


ERIC WILLIAM CLASSEY
1916–2008

I probably met Eric when I was a small schoolboy and he was manager at Watkins and Doncaster in The Strand. The shop was dark and antiquated and sold all entomological needs and was a heaven to a boy collector. My first proper meeting was in 1983 when we met at meetings. He was such an enthusiast and knowledgeable man who had the good fortune to be sent to the Entomological Laboratory in Mytchett working for the Royal Army Medical Corps during the war. Here he taught doctors the terrors of foreign countries and their unpleasant bugs especially mosquitoes.

Eric travelled widely in later life, enjoying hospitality of other enthusiasts and was greatly appreciated for his boundless energy and knowledge. We spent many holidays together, some with Claude Rivers and Karl Bailey in Tenerife. Later he joined my wife and me in Spain where we had a house. Late at night glass in hand, sitting on the flat roof of the house he would entertain us describing the idiosyncrasies and pleasure of many well known entomologists he had known. He was always first up in the morning to see what was by the moth lamp and could identify almost every one. He recalled these days as some of the happiest of his life. Eric's knowledge of language was phenomenal. He would telephone us frequently to say he had found a mistake in the Telegraph, be it grammar or spelling. This always amused him. He could tell a well remembered joke and told them well.

I shall miss Eric; his energy, his enthusiasm, his sense of fun and most of all his love of entomology and flowers especially orchids.

PETER EDWARDS

Eric was born in Queen's Park, West London and left school at 14 to work in the biological laboratories of St. Mary's Hospital. He soon left there to join the

Entomology Department of the Natural History Museum, London where his task was setting specimens of beetles. From 1939–1945 he served with the Army Medical Corps teaching medical entomology. After the war he decided to join the firm of Watkins and Doncaster based in The Strand in preference to returning to academia. Eric obviously enjoyed working here, as it was a fascinating place to be, with regular visits by professional entomologists from the museum as well as amateur entomologists calling in to buy the latest equipment and cabinets. By all accounts the building itself was rather dingy with piles of store boxes and other entomological paraphernalia cluttering some of the rooms. Peter Abery, who worked there for a short period during this time, had the task of transferring saleable specimens of Lepidoptera from old collections into new trays and store boxes. This task soon palled as he found he much preferred working with live insects (which he achieved later in life) and this may have been evident to Eric, who told him off one day for having come back late from lunch (Peter had simply got lost as a newcomer in London). They remained good friends nevertheless. W & D was an exciting place to be and learn the tricks of the trade – how to collect and preserve specimens and which books were best for identification.

Eric's eternal love of books led him to found his own firm, E. W. Classey in 1950, selling 'new and second hand entomological literature – large stocks of separata and reprints on all Orders' based at 4 Church Street, Isleworth. This was a great success and became E. W. Classey Ltd. in 1959. For the remainder of the century this was *the entomological book shop* in Britain. If a second hand book was not in stock, Eric would invariably note down your request and inform you by phone or card when a copy had been found, at a mutually agreeable price. Eric was as interested in a book reaching a good home as the sale of the book itself (or so he made it seem!). This was at a time when there was far less communication than today and far fewer entomological books available.

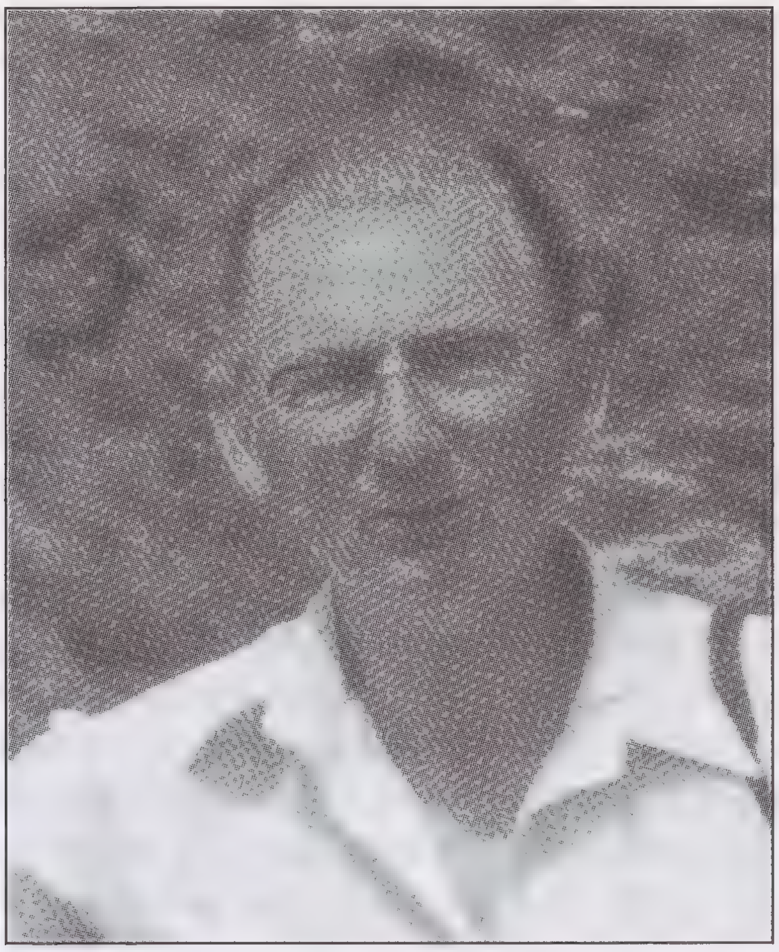
I well remember my first visit to an AES Exhibition in 1964 and being amazed at Eric's stand with hundreds of entomology books for sale. I never knew so many books on insects existed. It was a goldmine for young entomologists and they flocked around his bookshelves and boxes of separata laid out on tables nearby searching for something to buy. The greatest joy was that even if you were not interested in Lepidoptera there were lots of interesting books on other Orders to peruse (very slowly of course). The first few Parts of the RES *Handbooks for the Identification of British Insects* had just been published and you could actually see and handle them for the first time and if you were lucky enough buy a cheap second hand copy. I still have my Nematocera key bought for 7/6d.

The rest is history. Eric's company was so successful that he moved it to larger premises in Farringdon where he remained for the latter half of his life. His continuing interest in studying Lepidoptera with numerous field expeditions coupled with his 'services' to entomologists such as the founding of the *Entomologist's Gazette* led to him being elected a member of the exclusive Entomological Club in 1953. A full account of Eric's exploits can be found in *Antenna* Volume 33 (1).

Eric joined this Society, then known as the South London Entomological & Natural History Society in 1936 and served on several committees before being elected President in 1952. He was elected an Honorary Member in 1978. He was also elected President of the Amateur Entomologist's Society and Vice-President of the Lepidopterist's Society and the Butterfly Conservation Society.

Eric helped the entomological community throughout his long life – we shall all miss him.

JOHN BADMIN



WILLIAM JAMES PARKER
1920–2009

Our former member Bill Parker died on 4 January 2009 aged 88. He was born in North London on 15 October 1920. He joined the Society in 1969 and remained a member until 1997.

Before joining this Society Bill had already been active in the Amateur Entomologists' Society, of which he was a Council member in 1969–1970. He was instrumental, together with Ken Willmott, in the formation of the AES Conservation Group, which started as the Amateur Conservation Group in 1967, within that Society. This Group initially concentrated its attention on butterflies but Bill recognised the need to extend this to other groups of insects and in 1968 he recruited David Lonsdale to run a Coleoptera section within the Group. Bill edited the first AES Conservation Group Bulletin in 1969, subsequent issues in 1970 and from 1972 onwards being edited by David Lonsdale.

Bill was always an active member of the British Entomological & Natural History Society and served on Council in the 1970s. He was for many years an assistant curator, working at first with Eric Gardner and then continuing with Eric Bradford and for the early part of my time as curator. He was responsible for processing most of the Lepidoptera collections that were received during that period, receiving his first mention in the Curator's report for 1973 for having cleared 100 drawers in that year. He continued with this activity up to the time we had to leave the premises of the Alpine Club. The collections then went into store for three years until our building at Dinton Pastures was completed in 1992. Bill assisted with the moves and with curation during our first full year at Dinton Pastures in 1993.

It was from Bill's contacts with the management at Dinton Pastures, through his bird watching activities there, that the idea of the Society having a building in the Park was first proposed. I had visited the Park with him in 1983, but only became familiar with it after Bill had made this suggestion when we were seeking new premises. This new location came to fruition after much consideration and the Society is indebted to him for having brought this possibility to our attention.

Bill's entomological interests lay principally in Lepidoptera and Odonata. He didn't keep many specimens, relying on a reference collection built up from the

Society's duplicates. He recorded these insects at several sites in Berkshire and also kept regular records of moths from his garden trap at Dorney Reach, Bucks. Among them was the first British specimen of a rare vagrant, the Jubilee Fan-foot *Zanclognatha lunalis*. This unfamiliar moth was found at his garden trap in 1976. It was put to one side and following its subsequent recognition, the record was published in 1977 by Peter Baker, to whom the specimen was donated.

The Society has received Bill's Lepidoptera records, which have been passed to the relevant county recorders. The Society has also received a large number of photographic slides covering most orders of insects, with Lepidoptera predominating, many of them supporting his local records. Bill was a keen photographer and he also assisted David Wilson with the photography at the Society's Annual Exhibitions over many years. His extensive range of slides on other subjects reflected his wide interests, most prominent being birds (especially ducks), flowering plants, fungi, churches and cathedrals, steam trains and travel by him and his wife Lois in several European countries, including Ireland, France, Italy, Greece, Poland, Hungary, Romania and the former Czechoslovakia and Yugoslavia. He was already familiar with Italy where he had served during the Second World War and had usefully gained a good knowledge of the Italian language.

Bill was also an active member in the 1960s and 70s of the now defunct Middle Thames Natural History Society. He worked for many years as an instruments engineer at Vandervell's in Maidenhead, finally retiring at the age of 67. Following retirement he made use of his fair sized garden, by training in horticulture and pursuing this on a small scale commercially.

Bill's wife Lois was interested in plants and fungi and was a companion on field meetings. She also had a wide interest in history and gave talks to local societies on historical subjects. Bill and Lois lived at Windsor from 1964 and moved to Dorney Reach in 1974. Sadly Lois died in 2001. Bill is survived by four children from a previous marriage and by Lois' three children from her first marriage.

Those who knew Bill will recall his cheerful disposition, dry humour and willingness to help wherever needed. The Society greatly benefited from his involvement over many years. The photograph shows him at Tintagel in 1983, while attending the Dipterists' Summer Field Meeting at St Agnes, Cornwall.

I am grateful to David Lonsdale, David Keen, Dafydd Lewis and David Wilson and to Bill's daughter, Corinne Nabavi, for information.

PETER CHANDLER

BRIAN KENNETH WEST
1919–2008

I first met Brian when I moved to Kent in the early 1970s and joined the Kent Lepidopterists' Group organised by Eric Philp. Moving south in those days was like moving back ten years in history as Kent had only just acquired its first motorway and the concept of shopping malls was in its infancy, not like the Midlands. The advantages though were that many of the most eminent lepidopterists of the day, such as Michael Chalmers-Hunt, Eric Bradford, Ian Watkinson, Paul Sokoloff and Brian lived in the county. Brian knew a tremendous amount about the Lepidoptera of west Kent and he often talked about his latest observations at these meetings and brought along specimens for display. He was particularly interested in the existence and frequency of colour forms. He continued to attend these annual gatherings, over a span of more than thirty years. His Kentish records have been added to the

county's Lepidoptera database, soon to be incorporated in the Kent & Medway Biological Records Centre and will be included in the new book on Kent Lepidoptera now in its final stages of completion.

His publishing record is exemplary and the majority of his notes have appeared in the *Entomologist's Record and Journal of Variation* from 1964 onwards. He also published in the Society's journal and as a result was invited to join the editorial board of the *British Journal of Entomology* in the 1980s. He was always helpful to me as editor and willingly refereed and edited all the manuscripts that I sent to him in a polite and efficient manner.

Brian was a regular exhibitor at the Society's annual exhibitions and kindly took on the task of acting as British Macrolepidoptera Recorder for the Society during the early 1990s. During his lifetime Brian acquired a large collection of moths, representative of many regions of the British Isles and it is pleasing to record that 5,000 of these have been selected for incorporation into the Rothschild-Cockayne-Kettlewell National collection housed at the Natural History Museum, London. An additional 5,000 non-British Lepidoptera specimens were acquired at the same time. Thus it is very likely that many of these specimens will be viewable on the internet in the near future as the RCK collection is digitised.

A more complete account of Brian's life, compiled by Paul Sokoloff, may be found in Volume 121 of the *Entomologist's Record*.

JOHN BADMIN

BENHS FIELD MEETINGS

Otmoor, Oxfordshire, 11 August 2007

Leader: **Paul Waring**. – This was one of those field meetings in which the weather was very good, hot and sunny all day, and the site produced lots of wildlife interest throughout the meeting, including in this case one of those uncommon wildlife scenarios that you will remember for the rest of your life. We also had a good haul of moths during the night session, and a good attendance of fifteen including three BENHS members, interested local naturalists and friends, and including Robin and Mary-Ann Edwards and their two young sons from Sussex and RSPB representative Ellen Lee. Otmoor is a site the BENHS has adopted for field meetings for several years, the aim being to visit in a different month each year, to build up wildlife data for spring, summer and autumn. A description of the site and some background information has been provided previously, with illustrations, in the reports of our field meetings on 26 June 2004, 23 July 2005 and 23 September 2006 (see *BJENH* **18**: 278–285, **19**: 257–262 & **20**: 216–218).

We had only been on site for a few minutes when we found a common toad in the rough grassy sward of Otmoor Close near the entrance from the village of Beckley. Beating the scattered bushes of common hawthorn in this area for caterpillars produced larvae of the Yellowtail moth *Euproctis similis* (Fuess.), the Grey Pug *Eupithecia subfuscata* (Haw.) and Common Emerald *Hemithea aestivaria* (Hbn.). Then, as we climbed up onto the top of the dyke bank by the pump house, at 15.25 h we heard and saw a young but fledged cuckoo being fed by a reed warbler (Fig. 1). The blood-red gape of the cuckoo was strikingly visible at a distance and its high-pitched cheep call piercing. The feeding visits by the parent reed warblers were so quick and every 1–2 seconds, as they darted to and from the reed-lined edges of the ditch to the perching cuckoo to put a single small food item into its mouth each time.

It was difficult to see exactly what they were catching, but it must have been very small insects. We easily spent half an hour watching all this action as most of us had never seen a young cuckoo being fed before.

Brown Hawker dragonflies *Aeshna grandis* (L.) were out in force along the ditches, zipping over tall fen vegetation. A turtle dove was calling from amongst the dyke-side willows. A red kite flew over, the result of a recent and successful reintroduction programme based to the south of Otmoor in the Chilterns. Red kites are now not an uncommon sight all over Oxfordshire. Four Small Copper *Lycaena phlaeas* (L.) butterflies were nectaring on ragwort by the first bird observation hide we came to on this RSPB reserve. There were larvae of the Cinnabar moth *Tyria jacobaeae* (L.) and several Common Blue butterflies *Polyommatus icarus* (Rott.) flying about.

We watched a mute swan and five cygnets on the shallow mere recently created by the RSPB and now surrounded by thousands of new plants of common reed *Phragmites australis* planted by volunteers. Several coots swam about on the water while two marsh harrier and a buzzard flew about on the far side. The RSPB has every reason to be proud of how raptors like this, and other birds are increasingly to be seen on this site in summer, benefiting from the new wetland habitats created or, more accurately, recreated for them since the RSPB acquired this land.

We discovered adult German wasps *Vespula germanica* (Fabr.), with diagnostic continuous yellow stripe on face, gnawing the reed-screen walls of the hide (det. Ivan Wright) and a nymphal case of a dragonfly which had climbed up the wall from the nearby waterside. Several Roesel's Bush Crickets *Metrioptera roeselii* (Hag.), recognised by their green "Nike" stripe (as per the brand of training shoes!), were active in the vegetation around the hide, and we beat a green Oak Bush Cricket *Meconema thalassinum* (DeGeer) from a small oak nearby.

Fig. 1. Reed warbler feeding fledgling cuckoo, Otmoor, 2007.

After we had spent the afternoon strolling around Otmoor, a weasel ran across the small, hedgerow-lined country lane as we headed up to the Abingdon Arms pub in Beckley for an evening meal of organic sausages made from pigs raised in the village. As we were eating on a table outdoors, overlooking Otmoor, we heard the alarm calls of small birds announcing a hobby which then flew over us into nearby willows. We noted a hare on our return to the reserve.

We were in for a very pleasant night monitoring the numbers of wetland moths benefiting from the efforts of the RSPB to recreate parts of Otmoor as one of the largest inland reed-bed and lagoon complexes in England. We got off to a promising start almost immediately with an Old Lady moth *Mormo maura* (L.) arriving as the night was just becoming fully dark, to one of ten sugar strips painted on fence-posts along the ditch just west of the pump-house.

We were pleased to trap plenty of wainscot moths, including the Common Wainscot *Mythina pallens* (L.), Smoky Wainscot *M. impura* (Hbn.), Southern Wainscot *M. straminea* (Treit.), Small Wainscot *Chortodes pygmina* (Haw.), Large Wainscot *Rhizedra lutosa* (Hbn.), Fen Wainscot *Arenostola phragmitidis* (Hbn.) and Bulrush Wainscot *Nonagria typha* (Thunb.) (one fresh male only) as well as other species dependent on emergent wetland plants, such as the Crescent *Celaena leucostigma* (Hbn.) and Gold Spot *Plusia festucae* (L.). Surprisingly, our catches did not include either the Twin-spotted Wainscot *Archanara geminipunctata* (Haw.) or the Brown-veined Wainscot *A. dissoluta* (Treit.).

As a measure of the productivity of the night – the total catch in the leader's standard Robinson light-trap fitted with 125W MB/U bulb and operated all night from dusk to dawn by the pump-house was 131 macro-moths of 40 species, and a total of 58 species of macro-moths was achieved for the night from three Robinsons and two actinic traps. The catch in our second Robinson trap was inspected by all of us just after midnight, before some of the party left for home and others of us prepared to sleep the night in our cars. We noted the first Large Wainscot of the night arrived just before midnight. Ron Louch and Jason Gosling manned a third Robinson trap most of the night on the dyke bank and noted that the only Bulrush Wainscot of the night arrived at 01.15 h. A 6W actinic trap operated further along the dyke bank captured 13 species of macro-moth including single individuals of four species not seen at the other traps: Single-dotted Wave *Idaea dimidiata* (Hufn.), Ruby Tiger *Phragmatobia fuliginosa* (L.), Lesser Yellow Underwing *Noctua comes* Hbn. and Svensson's Copper Underwing *Amphipyra berbera* Rungs. Finally, our second actinic trap was placed right out in the open reed-dominated habitat. This trap captured fewer moths than the traps near the hedgerows, but more Southern Wainscot than any other, a female of *Chilo phragmitella* (Hbn.) which is dependent on common reed, and piles of dead chironomid midges. The only other moths in this trap were two Flame Shoulder *Ochropleura plecta* (L.), a Large Yellow Underwing *Noctua pronuba* (L.) and a Silver Y *Autographa gamma* (L.).

Other noteworthy moths included five Magpie moths *Abraxas grossulariata* (L.) in Ron's trap by blackthorn hedgerows from which PW has previously beaten the larvae, and singletons in each of the other traps, further from these hedges. A Dark Umber *Philereme transversata* (Hufn.) arrived just before midnight near the pump-house, and afterwards single, freshly emerged individuals of the Dusky Thorn *Ennomos fuscantaria* (Haw.), September Thorn *E. erosaria* (D. & S.) and Canary-shouldered Thorn *E. alniaria* (L.).

The night was dry with cloud only late in the night and then a few spots of rain about 05.00 h and moths continued to arrive throughout the night.

There was a beautiful sunrise. Ron and Jason observed a hobby flying over at 05.40 h and two marsh harriers quartering the moor soon afterwards. The hobby may well have been on the hunt for the Brown Hawker dragonflies which were seen on the wing from first light. Ron confirmed a Cetti's warbler singing amongst the reeds by the pump-house as we packed up our gear.

The leader would like to thank all those who supported this event and made it such a good day and enjoyable moth-trapping session. He also thanks particularly Ellen Lee, a volunteer for the RSPB, who met us at the start of the meeting and opened up the pump-house for our power supply use, such that generators were not required and their noise did not intrude on the atmosphere of this peaceful site. Copies of this report, and the full list of species from the night, have been supplied to the RSPB and to Martin Townsend as County Moth Recorder for Oxfordshire.

Hogmoor Inclosure, Bordon, Hampshire, 18 May 2008

Leader: **Stephen Miles.** – The meeting was organised as a joint meeting of the Alton Natural History Society (ANHS) and the British Entomological and Natural History Society (BENHS). The purpose was for a general natural history recording walk to obtain more site information for the Local Biodiversity Action Plan. Those who attended the afternoon part of the meeting comprised seven ANHS members, one other BENHS member besides the leader and two guests. The weather was fortunately dry and there were occasional sunny periods.

Unfortunately due to local vandalism one of the remaining heathland patches had been fire damaged just a few days before the meeting. However, the party observed a number of common lizards scuttling about near their burrows in the fire burned areas, one of which was still active despite having a tail that was nearly burned off. This is of course continued evidence of the fact that people and heathlands do not mix. It also illustrates the ineptitude of the current national Government in choosing Bordon and surrounding areas as a future Strategic Development Area (SDA). A small nest of the ant *Formica sanguinea* Latr. had been revealed by the fire in this burnt area, the ants were still quite active and some ling patches still survived there. This large red ant is reported as having the habit of collecting the pupae of other ant species, some of which are eaten but others may hatch out and are said to work co-operatively in the nest community of their new home.

Because this area of heathland is surrounded by badly sited urban developments it also suffers from dumping of garden refuse by irresponsible members of the local community. However, it is interesting to note that dumped plastic sacking or grass cuttings often provide excellent homes for slow-worms of various ages – June Chatfield discovered three of these charming reptiles, while searching for snails under this material. One common toad was also seen near to a recently cleared area, destined for building development, which had returned back to its original heathland habitat. Elsewhere in Hogmoor Inclosure, much of the former heathland suffers from invading trees. Other mesotrophic species result from the increased nitrogen fertilisation as alien plants are dumped on the site and dog faeces and urine are introduced to the site by the many dog walkers.

In her notes, June pointed out that she saw only 12 species of snails. A reduced fauna, as you would expect because of the dry acid soil conditions. These species mostly occurred near habitation where the soil chemistry may have changed due to human activities. A species that benefits locally from human numbers on these acidic sites is the Brown-lipped Snail *Cepaea nemoralis* (L). A number of empty shells of these animals that had been probably killed by the recent fire were found. The Garlic

Glass Snail *Oxychilus alliarius* (Miller) was also present, a normal inhabitant of acidic sites, this mainly occurs in dead wood and leaf litter. A species associated with trees, the Dusky Slug *Arion subfuscus* (Draparnaud) was also found.

June also found the fungus, Cramp-balls *Daldinia* cf *vernicosa,* already growing on burnt wood following the recent fire.

On the dry sandy paths green tiger beetles *Cicindela campestris* L. were observed, a good sign that no damaging hard surfacing of the paths had yet occurred here. The leader caught a solitary bee, which was later identified as *Andrena barbilabris* (Kirby), a frequent spring species that occurs on sandy soils. A single hornet *Vespa crabro* L. was also seen in flight in the central area of the site.

At least 20 immature spikes of broad-leaved helleborine flowers were found by the participants, just north of the main pond on the site. This species is quite frequent throughout Hampshire. June Chatfield mentioned that the most noteworthy plant she found was bird's-foot, *Ornithopus perpusillus,* a small plant of the pea family that grows in sandy unsurfaced paths with open ground.

Unfortunately, no significant bird species were seen or heard by Steve Mansfield, the ANHS birdwatcher. Of the butterflies, only one Speckled Wood *Pararge aegaria* (L.) and two Holly Blues *Celastrina argiolus* (L.) were seen, plus an example of the day-flying moth, the Latticed Heath *Semiothisa clathrata* (L.).

The leader thanks the Chairman of the Longmoor Conservation Group, representing Defence Estates, for permission to visit.

Hogmoor Inclosure, Bordon, Hampshire, 18 May 2008

Leader: **Stephen Miles**. – This was a joint meeting with members of the Alton Natural History Society. Prior permission was obtained from the site owners, the Ministry of Defence, for the use of generators and light traps. These were placed about 300 m east of the site's western edge, within a small area of open heather.

The evening was dry but cold for the time of year, with a temperature of c.12°C. Nevertheless three members of the ANHS besides the leader turned up and eight other local moth enthusiasts attended. Two mv lights were run by Bill Wain and Nick Montigriffo and one actinic light was used by David Hamilton. These were run for approximately 2.5 hours, the trapping period ending at about midnight.

In all, 59 moths were trapped comprising 36 species, of which seven were new to the tetrad based on the published records in "Moths of Hampshire and the Isle of Wight" by B. Goater and T. Norriss; no BAP or RDB species were found. The more local of the species in the traps in terms of their 10 km square occurrence in north and east Hampshire were; one Alder Moth *Acronicta alni* (L.) currently known from thirteen 10km squares, one Poplar Lutestring *Tethea or* (D. & S.), currently known from eleven 10 km squares and two specimens of the Seraphim *Lobophora halterata* (Hufn.), one in one of the mv lights and one in the actinic trap, currently known from fourteen 10 km squares. Most of the visitors were pleased with the evening, as they were able to take photographs of those species that they had not seen previously.

The leader wishes to thank the Chairman of the Longmoor Conservation Group, representing Defence Estates for permission to hold both of these meetings.

Kingsgate Community Orchard, Holbeton, Devon, 7 June 2008

Leader: **Roy McCormick**. – The weather for the afternoon meeting was rather inclement with thunder storms and torrential rain; one member even reported travelling through roads covered in hailstones. Three others turned up and we

sheltered in our cars until the rain eased off. The rain finally relented with the promise of some sunshine, but the beating tray was left behind. Keith Alexander went rooting for the smaller insects and found several small flies, bugs, ants and beetles. Searches were made for leaf miners, but to no avail and when beating was finally undertaken, the only larvae seen were three *Operophtera brumata* (L.) (Winter Moth); one *Cosmia trapezina* (L.) (Dun-bar) and a possible *Epiphyas postvittana* (Walk.) (Light-brown Apple Moth). The sun was shining quite well by this time but a couple of pheromone lures proved to be non productive probably because most flying insects had more sense than us and kept under cover! The weather reverted and specks of rain were beginning to fall again so we retreated to our vehicles. Time was getting on and with dinner time approaching, some of the party said goodbye while two of us repaired to the local hostelry. The rain kept coming and I thought the Community event was going to be a wash out, but the clouds cleared completely and we were left with a clear sky. Yes, you guessed it, it went cold . . . .

The local Community Event, with people paying to get in, was arranged so that members all the Entomological Groups would be exempt. The Orchard Group set up their table around 19.30 h and we arrived with our equipment soon afterwards; there were four of us with traps and these were placed along the hedgerows bordering the site. A large number of people arrived and were interested in our preparations, and they all had to suffer the dreaded Health and Safety lecture before we started in earnest. Rob Wolton, (DMG Conservation Officer) kindly brought along a striking Puss Moth caterpillar and Privet Hawk-moth pupae, allowing a handling session; dusking was not even considered with all the foliage thoroughly wet and people asking questions about moths and butterflies. We gained one new member for the Devon Moth Group so I consider that a result.

The first few moth species in were tubed or potted and passed around for comment – amazement all round! Moths were sparse with very few specimens coming in, but we still managed 43 species including the three species of larvae seen during the afternoon. We worked at it until around 23.00 h when the Orchard Group member announced that refreshments would be served in the village hall. As the temperature was now down to 8°C, we did not need any encouragement to get some warm drinks inside us. It was about this point that we said our goodbyes to most of the paying public and made our way back to see what had come in; the situation was pretty dire with little extra at the lights, so we decided to pack up. We left the site at around 00.30 h. Of the 43 species the most notable were. one *Timandra comae* (Schmidt), (Blood Vein); one *Catarhoe rubidata* (D. & S.) (Ruddy Carpet), one *Macaria alternata* (D. & S.) (Sharp-angled Peacock) and one *Autographa jota* (L.) (Plain Gold Y). Only *Diarsia mendica* (Fabr.) (Ingrailed Clay) reached double figures.

Keith Alexander kindly provided an account of the other Orders seen. Traditional orchards are of considerable potential importance for invertebrates and the special species known from this UK BAP Priority Habitat come in the following assemblage types: (a) Wood-decay (saproxylic) invertebrates, especially those which are associated with decaying heartwood and particularly the wood mould which accumulates in the bottom of the hollowed trunks; (i) the older apple trees at Holbeton had been hollowed by the weeping polypore *Inonotus hispidus* but none of the special beetles which develop in this situation could be found, (ii) galleries of the large fruit bark beetle *Scolytus mali* (B. & S.) were present on the trunk of a standing dead tree; this species has Nationally Scarce status but merits down-grading as it has been found to be widespread in traditional orchards, and (iii) the digger wasp *Pemphredon lugubris* (Fabr.) was found in a cavity in white-rotten heartwood on one of the apple trees; this is also a widespread species.

(b) Epiphytic invertebrates associated with the lichen and moss cover on the trunk and boughs: (i) A good range of barkflies were found at Holbeton including the large picture-winged species *Loensia fasciata* (Fabr.), as well as *Philotarsus parviceps* Roesler, *Elipsocus hyalinus* (Stephens) and *Mesopsocus unipunctatus* (Müller); these are all widespread species.

(c) Foliage fauna: (i) Very little was found on the foliage at Holbeton although this may have been at least partly due to the recent heavy rainfall; *Psallus ambiguus* (Fallén), a typical plant bug which feeds on apple as well as other broadleaved trees was present on a number of apple trees.

Other species noted were: Coleoptera – *Cantharis cryptica* Ashe, *Calodromius spilotus* (Illiger), *Euophryum confine* (Broun), *Anaspis pulicaria* A. Costa and *Cylindrinotus laevioctostriatus* (Goeze), Diptera – the soldier flies *Chloromyia formosa* (Scopoli), *Microchrysa cyaneiventris* (Zetterstedt) and *Pachygaster leachii* Stephens in Curtis, the hoverfly *Syritta pipiens* (L.), and the millipede *Cylindroiulus punctatus* (Leach).

Railway Land LNR, Lewes, East Sussex, 7–8 June 2008

Leaders: **Peter Hodge** (daytime session) and **Sam Bayley** (evening/night session). – This meeting at the Railway Land LNR, situated close to the centre of the county town of East Sussex was timed to coincide with National Moth Night and was organised jointly by BENHS and the Sussex Moth Group. The daytime session attracted just two entomologists, Vic Downer, an Odonata specialist, who responded to an advert posted on the Adastra Newsgroup operated by Sussex Biological Record Centre and Roy Meller, a member of the Sussex Moth Group. We followed a circular route around the reserve and although the weather was perfect there was not a great deal of insect activity.

Approximately 60 species of insects were recorded, some of which were welcome additions to the reserve list. Several species of dragonflies and damselflies, including the Red-eyed damselfly *Erythromma najas* (Hansemann), were recorded close to the new reed-bed known as the "Heart of Reeds" and along the ditches in the nearby water meadows. A possible sighting of the White-legged damselfly *Platycnemis pennipes* (Pallas) prompted Vic to return to the reserve the following day and although there was no sign of this insect two further species, the Hairy dragonfly *Brachytron pratense* (Müller) and the Black-tailed skimmer *Orthetrum cancellatum* (L.) were added to the reserve's list.

A male *Anisodactylus binotatus* (Fabr.) (Coleoptera: Carabidae), discovered by searching under clods of loose soil in one of the water meadows, was a new species for the reserve. The Nationally Scarce (Na) flea beetle *Longitarsus rutilus* (Illiger) (Chrysomelidae) was plentiful on water figwort *Scrophularia aquatica* L. growing beside paths in the "Heart of Reeds" and the weevil *Zacladus exiguus* (Olivier) (Curculionidae) was tapped off hedgerow cranesbill *Geranium pyrenaicum* Burm growing on the bank of the River Ouse.

Hymenoptera included a specimen of the RDB3 Blue carpenter bee *Ceratina cyanea* (Kirby) (Apidae) flying close to the bank of a dyke and the spectacular black and yellow-banded sawfly *Tenthredo scrophulariae* L. (Tenthridinidae) was seen flying around water figwort in the reed-bed.

The evening/night session was attended by several members of the Sussex Moth Group and a few supporters of the Railway Land Wildlife Trust. Conditions were perfect with little wind and overcast skies. Two moth traps were operated a short distance apart, close to the "Heart of Reeds" and 51 species of macro-Lepidoptera

and 15 species of micro-Lepidoptera were recorded, 61 of which were apparently new to the reserve list. Although no especially notable species were seen the following are given as examples of the more interesting species recorded: Figure of Eighty *Tethea ocularis* ssp. *octogesimea* (Hübner) (Thyatiridae), Yellow-barred Brindle *Acasis viretata* (Hübner), Blotched Emerald *Comibaena bajularia* (D. & S.) and Pretty Chalk Carpet *Melanthia procellata* (D. & S.) (Geometridae), The Coronet *Craniophora ligustri* (D. & S.) and Heart and Club *Agrotis clavis* (Hufn.) (Noctuidae).

The leader would like to thank Dennis Dey of the Sussex Moth Group for kindly sending me a list of moths recorded.

Braunton Burrows, Devon, 12 July 2008

Leaders: **Roy McCormick and Rob Wolton.** – Barry Henwood and the leader decided to do a bit of daytime searching at Saunton Sands and back to Braunton during the afternoon before the advertised meeting in the evening. At Saunton a few larvae and mines were found including *Emmetia marginea* (Haw.), *Lyonetia clerkella* (L.) (Apple Leaf Miner) and *Perizoma albulata albulata* (D. & S.) (Grass Rivulet) in the seed pod of yellow rattle. One exciting find was an adult of *Schreckensteinia festaliella* (Hübn.), a micromoth which feeds on bramble. We also found several micromoth larvae in ragwort flowers spun together; these were unknown to us and so were brought home to breed out along with more unknown larvae in flower heads of carline thistle; a few day flying moths and butterflies were also noted. At Braunton we met up with Stella Beavan and Bob Heckford who had seen several species of butterflies and flushed out some adult micromoths and a few *Stenoptilia pterodactyla* (L.). We also found larvae and pupae of *Zygaena filipendulae stephensi* Dup. (Six-spot Burnet) along with larvae of *Tyria jacobaeae* (L.) (Cinnabar); quite a productive afternoon and in good sunny conditions, albeit a bit windy.

After dinner, we met up with the main party at Sandy Lane car park. Richard Fox and John Breeds had managed to attract several local people in to discover moths and were planning to run their lights just off the track going west from the car park, whereas Steve Hatch, Dave Paull, Barry and the leader headed south, just off the end of this car park (the site where Reddish-light Arches was discovered). The evening sky was mostly clear and promised a cold night, but we were there, so nothing ventured!! We set out our gear, around eight traps in all and carried out a bit of dusking; this produced a few *Pleuroptyra ruralis* (Scop.) (Mother of Pearl) from a nettle patch, but little else. The generators were started and we had high hopes of attracting our target species, but it was not to be.

Our list built steadily with half a dozen *Coleophora trifolii* (Curt.) (Large Clover Case-bearer) an attractive metallic green micromoth; one *Ethmia dodecea* (Haw.); one *Phlyctaenia stachydalis* (Germ.); two *Trachycera marmorea* (Haw.); four *Stenoptilia pterodactyla* (L.); one *Eilema complana* (L.) (Scarce Footman); one *Agrotis ripae* (Hübn.) (Sand Dart); two *Brachylomia viminalis* (Fabr.) (Minor Shoulder-knot); four *Pyrria umbra* (Hufn.) (Bordered Sallow) and six *Lygephila pastinum* (Treit.) (Blackneck). Despite our searches during the afternoon for the foodplant *Vicia cracca*, (Tufted Vetch) of this last species, we never saw any sign of this; we did however find lots of *Melilotus altissima* (Tall Melilot) which could be an alternative hostplant. Our species list at the end of the session, around 01.00 h was 95, but after we added in the unidentified micromoths we finished with a grand total of 105. Overall not a bad night, though without our target, *Apamea sublustris* (Esp.) (Reddish-light Arches).

Slab Common, Bordon, Hampshire, 19 July 2008

Leader: **Stephen Miles**. – The joint meeting with members of the Alton Natural History Society was held on a dry and mainly clear evening. Two mv lights were run by Bill Wain and John Phillips and an actinic light was used by David Hamilton. Two of these were run for approximately 2.5 hours, the trapping period ending at about midnight, with the mv trap of John Phillips continuing until 01.00h. The individual locations chosen for the use of the light traps were within an area up to 150m south of the road going along the northern edge of the common. One mv trap was located in an area of open bare ground above a wetland area, and another in scrubland, the actinic light trap was situated between groves of Scots pine trees.

At least 80 specimens were attracted to the lights, comprising 59 species of moths, which were all new to the SU7836 tetrad, as only one moth had been previously recorded from it. These facts are based on the published records in "Moths of Hampshire and the Isle of Wight" by B. Goater and T. Norriss.

One notable (Nb) species, the Horse Chestnut, *Pachycnemia hippocastanaria* (Hübn.), consisting of two individuals, one attracted to the actinic light and one to the mv light in the bare ground area. This was the only species with a designated status taken on the night: it is a characteristic species of these heathlands, occurring in 14 ten km squares in north east Hampshire. The other, more local but undesignated species in the traps in terms of their 10km square occurrences in north and east Hampshire (for reference see the distribution maps at www.hantsmoths.org.uk) were; one Small China Mark, *Cataclysta lemnata* (L.), currently (post 2000), known from six squares, and the Grass Emerald, *Pseudoterpna pruinata* ssp. *atropunctaria* (Walker) also known from six squares.

Endotricha flammealis (D. & S.), Buff Arches *Habrosyne pyritoides* (Hufn.), Riband Wave *Idaea aversata* ab *remutata* (L.), Brimstone Moth *Opisthograptis luteolata* (L.), Drinker *Euthrix potatoria* (L.), Large Yellow Underwing *Noctua pronuba* (L.), True Lover's Knot *Lycophotia porphyrea* (D. & S.) and Pale Prominent *Pterostoma palpina* (Clerck) were all present in double figures. Yellow-tail *Euproctis similis* (Fuessly), Nut-tree Tussock *Colocasia coryli* (L.) and the Dun-bar *Cosmia trapezina* (L.) were both present in double figures and occurred in all three traps. John Phillip's trap had the most species in it with 38 recorded.

In comparison to the tetrad immediately south, SU7834, Whitehill, on the northern edge of Woolmer Forest, if the night's catch had been taken in this square, which was well recorded by D. Wright and D. Ffennell in the 1950s and 1960s the results would have been as follows. Eleven of the specimens would have been entirely new to this tetrad and another eleven species would have been moths not seen since the period 1951 to 1980.

For permission to hold this meeting thanks go to the Chairman of the Longmoor Conservation Group, representing Defence Estates.

Ashridge Farm, Sandford, Devon, 26 July, 2008

Leaders: **Roy McCormick and Rob Wolton**. – Fourteen people attended this evening meeting, most of whom were members of the Devon Moth Group. Eleven traps of varying design were placed out over a wide area, all within the one 1 km square (SS8106) covering a newly mown hay field, grassy fields and edges of woodland above Binneford Water, one of the waterways leading into the River Creedy.

The traps were all started, but dusking was tricky as there was a steady slope down to the stream which became slippery with the early dew. A swarm of small flies settled over each trap as we began our rounds, so much so that we decided to leave checking one or two to later in the evening. Even so, as the night wore on, members could occasionally be heard choking as they swallowed a gnat. Moths soon started to come in, and it was clear we were in for a good night. Specimens were passed around the group and admired, both the colourful and large by newer members and the more obscure and challenging by old hands. Numbers of species on the list increased rapidly, and before long it was apparent we might even record more than one hundred. Around midnight, satiated with moths and as the chill and thoughts of bed set in, members gradually dispersed and by 01.00 h we packed up, ready for our host, Richard Burston plus quad bike to help us cart our heavy traps back the vehicles.

The list finished up at an impressive 110 species with around twenty of these reaching double figures. The most interesting species for the night were: one *Argolamprotes micella* (D. & S.); one *Acentria ephemerella* (D. & S.), (Water Veneer); four *Eudonia delunella* Stain.); two *Chlorochlysta citrata citrata* (L.), (Dark Marbled Carpet; two *Plemyria rubiginata rubiginata* (D. & S.), (Blue-bordered Carpet); one *Eupithecia linariata* (D. & S.), (Toadflax Pug); one *Biston betularia f. insularia* (L.), the melanistic form of the (Peppered Moth), an unusual sighting in Devon; four *Deileptenia ribeata* (Cl.) (Satin Beauty), very worn specimens; five *Eilema complana* (L.), (Scarce Footman); 15 *Craniophora ligustri* (D. & S.), (Coronet), although a common species where ash trees grow, we had one of these that was almost black all over; one *Chortodes pygmina* (Haw.), (Small Wainscot), although common it was a surprise to see this out early, and three *Laspeyria flexula* (D. & S.), (Beautiful Hook-tip). All in all an excellent night and the second time in recent years we have breached the magic 100. Our thanks to Richard for hosting an excellent event: the great diversity of moths we recorded reflects his careful management of the farm, and is a tribute to the work he has been doing to create new wildlife habitats and enhance existing ones.

Windmill Creek, Sheppey, Kent, 29 July 2008

Leader: **John Badmin**. – This was a joint excursion of the Kent Field Club with members of the British Entomological Society, London Natural History Society and Royal Entomological Society. It was one of the 250 public events held to 'celebrate insects' during National Insect Week 2008. The dozen or so people who turned up were all experienced entomologists with a lot of knowledge of plants. The weather was not perfect for insects, with a fair amount of cloud and an intermittent breeze but the sun peeked through frequently such that the leader acquired a nice red face by the time we returned to our cars.

The main objective of the meeting was to walk quickly across Eastchurch Marshes to investigate the sea wall and saltmarshes surrounding Windmill Creek, an area normally quite difficult to reach without a very long walk. Of course we succumbed to recording on the way and it still took us the best part of two hours to reach the Creek.

The main track was patrolled by Odonata including the black-tailed Skimmer *Orthetrum cancellatum* (L.), emperor dragonfly *Anax imperator* Leach and common darter *Sympetrum striolatum* (Charpentier). Large numbers of blue-tailed damselfly *Ischnura elegans* Vander Linden were flushed from rank vegetation especially along the ditches. Daniel Bennett and Guillaume Marchais managed to spot a faster

moving damselfly and this proved on close inspection and long debate to be the RDB scarce emerald *Lestes dryas* Kirby at a new Kent locality.

Not to be outdone, LNHS members, Mick Massie and Neil Anderson spotted marsh harrier, hobby and 30 curlew flying at a great distance over the marshes. Their eyes were also attuned to mammals: noting the presence of water vole (nibbles), stoat (headless prey), mole (no guessing), fox and occasional rabbit.

Plants of interest included white mullein *Verbascum lychnitis* normally found on chalk (but recorded from here in the Atlas), bastard cabbage *Rapistrum rugosum*, the maritime umbellifer *Torilis nodosa* and marshland buttercups *Ranunculus baudotii* and *R. sceleratus*. It was hoped to find the rare small red goosefoot *Chenopodium botryodes* but we were slightly too early.

Laurence Clemons recorded over 70 species of Diptera, of particular interest were the very local soldier flies *Stratiomys longicornis* Scopoli, *Nemotelus notatus* Zetterstedt and *N. uliginosus* (L.), the notable ulidiids *Melieria cana* (Loew) and *M. picta* (Meigen) and muscid *Lispe loewi* Ringdahl and the pRDB3 hybotid *Platypalpus ingenuus* (Collin). Eight hoverfly species were seen including *Eristalinus sepulchralis* (L.) and an attractive red form of *Volucella bombylans* (L). Two Notable chloropids, *Dicraeus scibilis* Collin and *Melanochaeta pubescens* (Thalhammer) were also observed.

Very few day-flying Lepidoptera were evident apart from meadow browns: but the occasional peacock (larva), red admiral, small tortoiseshell, small heath and six-spot burnet were noted. The saltmarsh patch we inspected had been grazed by cattle and rabbits but in an area of more lush vegetation we found a few late instar caterpillars of the ground lackey moth *Malacosoma castrensis* L.

The most ubiquitous hoppers were the spittle bugs *Philaenus spumarius* (L.) and *Neophilaenus lineatus* (L.), together with the leafhoppers *Eupteryx florida* Ribaut and *E. urticae* (Fabr.) on patches of *Stachys* and nettle, respectively. Also noted were the leafhoppers *Streptanus sordidus* (Zetterstedt), *Psammotettix putoni* (Then) and a few individuals of the Thames speciality *Chlorita viridula* (Fallén).

The area where the Essex Emerald moth *Thetidia smaragdaria* (Fabr.) was last recorded is remarkable for the relatively small amount of its hostplant present, whereas there are much more lush patches of sea wormwood elsewhere on the island. These spots were surveyed for larvae in 2007 by the leader and Jon Bramley but without success.

All in all a most enjoyable day in the field. Photographs taken on the day by Mick Massie can be inspected at http//picasaweb.google.com/mick.massie/ 2008_0629Sheppey.

Watersmeet, Devon, 8 August 2008

Leader: **Roy McCormick**. – Twelve people, mostly members of the Devon Moth Group turned up on this rescheduled evening meeting. The light traps were placed at Watersmeet House, Two Moors Way and Hillsford Bridge thus covering a wide area. The main objective of the meeting was to refind *Diarsia dahlii* (Hübn.) (Barred Chestnut), a species which had been spotted at the site two years previously.

With twelve lights running we thought there was a good chance of seeing this elusive moth. After we had all set up and started our lights, moths were sparse though our list built steadily. Steve Hatch at Watersmeet House recorded *Chloroclysta citrata citrata* L. (Dark-marbled Carpet); *Perizoma taeniata* (Steph.) (Barred Carpet); *Eupithecia expallidata* Doubl. (Bleached Pug); *Discoloxia blomeri*

(Curtis) (Blomer's Rivulet); *Abraxas sylvata* (Scop.) (Clouded Magpie) and 'hallelujah!' fresh males of *Diarsia dahlii.* He had the beginnings of a very good list which finished up with 58 species with additional sightings of one *Catoptria margaritella* (D. & S.); a couple of *Deileptenia ribeata* (Cl.) (Satin Beauty); one *Alcis jubata* (Thunb.) (Dotted Carpet); one *Eilema complana* (L.) (Scarce Footman); a couple of *Schrankia taenialis* (Hübn.) (White-line Snout) and one *Schrankia costaestrigalis* (Steph.) (Pinion-streaked Snout). We liaised with Steve at the end of the session to see how he had got on, and he reported seeing five Barred Chestnut, with one of these a female from which he obtained four eggs before it expired.

Back to our traps where our count had gone up considerably, but it was difficult to visit each trap site more than twice because of the spread, so by the time we had completed a couple of rounds, time had progressed to around midnight. Peter Franghiadi managed to record a further five *D. dahlii* at his lights during the night. However with the air temperature dropping it was decided to start packing up as few moths were flying and we all had long drives home. We left at 01.30 h having had an uplifting night actually seeing our target species at two of the sites we had placed traps.

The list of species for Hillsford Bridge reached 73 with the best of these: one *Eudonia truncicolella* (Stainton); one *Jodis lactearia* (L.) (Little Emerald); three *Chloroclysta citrata citrata* (L.) (Dark Marbled Carpet); one *Colostygia olivata* (D. & S.) (Beech-green Carpet); two *Euphyia biangulata* Haw. (Cloaked Carpet); one *Eupithecia expallidata* Doubl. (Bleached Pug); two very worn *Hydrelia sylvata* (D. & S.) (Waved Carpet); four *Abraxas sylvata* (Scop.) (Clouded Magpie); one *Deileptenia ribeata* (Cl.) (Satin Beauty); one *Eilema complana* (L.) (Scarce Footman); five *D. dahlii* (Barred Chestnut) as reported above, and one *Schrankia costaestrigalis* (Steph.) (Pinion-streaked Snout). At least we now know for certain that Barred Chestnut does occur at Watersmeet and that the previous individual catches were part of a resident colony of this moth as we suspected.

It was a good decision to bring forward this meeting by one day, as on the Saturday, it rained incessantly all day across the whole of Devon.

Shellness NNR, Sheppey, Kent, 10 August 2008

Leader: **John Badmin**. – This was a joint meeting of the Kent Field Club and the British Entomological & Natural History Society. Fifteen members attended on a bright sunny day with a very strong southerly wind, which kept most insects hidden deep down in the vegetation.

Most of the group wandered along the sea-shell shingle bar to the ness in the morning and waded back through the thick saltmarsh vegetation in the afternoon, but several did it the other way round. Characteristic shingle plants included marram, sea couch, frosted orache, *Phleum arenaria*, *Cakile maritima* and Ray's knotgrass, *Polygonum oxyspermum* ssp. *raii*, now very local in Kent. The greatest surprise was the 'recent' establishment of a single bush of shrubby seablite *Suaeda vera* – a species normally absent from Kent, but first recorded in the county in recent times by George Morgan from the Lydd ranges on the Kent–Sussex border (1982 Atlas). Our interest in plants and insects soon came to the attention of the local residents of Shellness hamlet, normally a secretive bunch highly protective of their private beach. But it turned out that one of them, Angus Idle, was a keen botanist and he joined us for lunch reminiscing about the changes to the area and pointing out some of the local rarities.

Fig. 1. Laurence Clemons stalking a fly on Shellness beach, Sheppey.

A few solitary bee species braved the wind to forage on the yellow composites and sea lavender as well as the bumblebees *Bombus lucorum* (L.), *B. pascuorum* (Scopoli), *B. lapidarius* (L.). Two individuals of the sphecid wasp *Ammophila sabulosa* (L.) were observed searching among the shingle vegetation. Several harlequin beetles *Harmonia axyridis* (Pallas) were also noted at this remote location.

The RDB3 horsefly *Atylotus latistriatus* (Brauer), a large species entirely restricted to saltmarshes in the South-East, was present throughout the reserve and kept us on our toes. Alan Stubbs collected a specimen in order to photograph its characteristic eye-banding.

Laurence Clemons was highly active with his net and as National recorder for picture-winged flies, was delighted to record three notable tephritids: *Myopites eximius* Seguy, *Campiglossa absinthii* (Fabr.) and *Tephritis divisa* Rondani, the last first-recorded in Britain in 2003 and now spreading in Kent. He also netted the notable chloropid *Eutropha fulvifrons* (Haliday). Laurence also tried out the 'Clemons collecting rod and tube' based on his own design, for capturing flighty flies which was a great success (Fig.1).

David Gardner spent a long time searching the saltmarsh for coleophorids without much success but managed to record larvae of ground lackey (plus an adult), the saltmarsh plume *Agdistis bennetii* (Curtis) and lime-speck pug *Eupithecia centaureata* (D. & S.) as well as adults of Essex skipper, common blue and meadow brown.

The leader was delighted to find the leafhopper *Psammottetix sabulicola* (Curtis), a species confined to a few sandy shingly areas in Kent and the RDB leafhopper *Chlorita viridula* (Fallén).

BOOK REVIEWS

Bees of Surrey by David Baldock. Published by the Surrey Wildlife Trust, 2008. 304 pages (plus 48 colour plates). £16.00 plus P&P. ISBN 978 0 9556188 1 9.

This is an impressive book and the latest in an impressive series from the Surrey Wildlife Trust documenting the flora and fauna of the county. There are three immediate impacts. Most obviously, it is sumptuously illustrated with 48 colour plates, which actually typically comprise up to six smaller images, so that the whole breadth of the bee family is well illustrated in a way that will allow the beginner to get a real feel for what these much under-recorded insects look like. Secondly, the book contains a well-written, technical but accessible key to allow for the identification to genus of any bee to be found in the British Isles. This fact alone is likely to make the book of wider appeal than just those living within the bounds of Surrey, since the lack of literature to allow the accurate identification of these insects is a big barrier that has inhibited many students from tackling the subject. The third point is more subtle but is the most impressive and that is that the book has been written after an intensive data search and survey project that has lasted a mere 12 years, from when the author first turned his attention to the group in 1996. This is a sobering thought and hopefully a stimulus to County Recorders across the land as to what can really be achieved if you "pull your finger out" (although being retired probably helps!). The modern survey has largely been the work of about six field workers, marshalled and led from the front by the author. From my perspective in Suffolk this is an embarrassment of riches, but it reflects the long and important history of Hymenopterists in Surrey, a topic summarised in the opening chapters of the book.

As one might expect, the book opens up with useful summaries covering the definition of the study area, geology and previous workers in the field. This is then followed by a discussion of the *modus operandi* by which the survey data were obtained, including literature searches, requests to entomologists across the country with records to contribute and the intensive field survey project. There then follows an analysis of gains, losses and trends within the aculeate fauna of Surrey and a quite detailed consideration of habitats and their associated bees, culminating in proposed "indicator species" for each major habitat type. There is no indication as to how the strength of these associations is calculated, which might worry the statistical purist, but this is nevertheless an important step in the field of assessing site and habitat quality capable of informing nature conservation management. Several pages are then devoted to discussing important aculeate sites across the county, with the introductory chapters rounded off with sections on bee ecology and tips for finding bees oneself.

The identification key has been written by Graham Collins, one of the field surveyors for the survey project and a leading light in the Bees, Wasps and Ants Recording Society (BWARS). It follows the usual dichotomous structure, but is clearly divided into groups of opposing characters and uses ample black and white line drawings to illustrate the inevitably subtle anatomical points needed to make discriminations. Thus, the key should be well within the grasp of a novice student

with a binocular microscope and the tenacity for careful observation. The main body of the book comprises the species accounts. These follow a familiar format within the Surrey Wildlife series, with distribution maps presented on a tetrad basis against a backdrop of a simplified geology map that can help illustrate gross habitat preferences for some species. Where applicable, the species concerned is cross-referenced with a colour plate and the accompanying text provides notes on national and county status, its ecology and an observation on whether or not it is spreading or declining in the county.

In 1996, when this survey project started, I was living just over the border in Farnborough, Hampshire, and I had just had my eyes opened to the wonders of the aculeate Hymenoptera and I wish this book had been available then. I sincerely hope that it will help inspire the inquisitive general naturalist to take a closer look at these fascinating insects. Many such people have pinned specimens from by-products of other study, or merely noticed small, robust insects flying about sandy cliffs or dead wood habitat and this book can provide the impetus to start putting names to those specimens although it must wait for other planned publications within BWARS to provide full species keys for this large and complex group. The supporting text on habitats and conservation value should benefit land managers and those charged with delivering nature conservation and Biodiversity Action Plan advice.

ADRIAN KNOWLES

Insect and Bird Interactions edited by Helmut F. van Emden & Miriam Rothschild. (Intercept Ltd., 2004). 301pp. £70.00 Hardback. ISBN 1-898298-92-0.

This is a very unusual book for two reasons. Firstly, the book has its roots in a conference run by The Entomological Club, that exclusive, but very approachable bunch who kindly organise the Verrall Supper for us each year in London. The Club had used the centenary of the Verrall Supper to organise its first conference in its 160-year history, at Reading University in 1987. As the tenth anniversary of the first conference approached it was decided to hold a second conference and the subject chosen was *Insects and Birds*. The second reason is that until then no-one had seriously thought of bringing ornithologists and entomologists together, to discuss the interactions between the most speciose group of animals on the planet and the one most admired by the general public. Those in the media who present wildlife on our TV screens believe insects are to be walked past en route to obtaining yet another shot of a wild elephant or lion, or are simply conceived as mere food for birds. This book, which was compiled some time after the conference and contains more recent findings, places insects and birds on a more equal footing.

The book comprises 20 chapters, each by a different group of authors, and is divided into four sections: Population management issues, Effects of insecticides on bird populations, Foraging behaviour of birds on insects and Ectofauna.

The first section works at the landscape scale and describes the problems of identifying and quantifying the invertebrate composition of avian diets (apparently what we think we see birds eat is not necessarily what they get), the effects of UK farming practices, both extensive and intensive on insect abundance and availability and ways forward to achieve a better balance between crop production and a viable network of sustainable wildlife habitats across the wider countryside. The chapters by Alison Baker (Insects as food for farmland birds – is there a problem?), John Holland (The impact of agriculture and some solutions for arthropods and birds)

and David McCraken *et al.* (The effects of farming practices on the prey of insectivorous birds) are thought provoking. One option, set-aside, has since been cast aside as farmers have had to respond to new EU practices. My personal preference is to tinker less with prime farmland and to transfer bigger blocks of wildlife-designated land to the ownership of Wildlife Trusts who have greater expertise in managing them for wildlife than farmers. The last chapter in this section, entitled 'Birds as predators of lepidopterous larvae' by David Glen, looks at bird predation of foliar feeding larvae and predation of overwintering stages. Lots of useful information here.

The next section deals with the direct and indirect effect of pesticides (not just insecticides) on bird populations: the intended declines in insect pests often leading to declines in insectivorous birds living in the wider landscape. The near extinction of raptors in Britain by organochlorines is described by Colin Walker. It is a touch ironic that Shell, who manufactured two of the most widely used insecticides of this class, was the first to build a fully automated gas chromatography/mass spectroscopy machine capable of routinely identifying minute residues of pesticides – a prerequisite for identifying the causal agents in these declines. These chapters are primarily aimed at applied entomologists.

The next, rather large section looks at the feeding behaviour of insectivorous birds and the ways some insects try to avoid being eaten. There are chapters on the avian retina (James Bowmaker), avian ultraviolet vision (Stuart Church *et al.*) and avian sense of smell (Nicola Marples). The use of warning colours by insects and the effects of odours in repelling birds are described by Nicola Marples and Miriam Rothschild and others.

The final section is along the lines of the biter bit. Brett Moyer and Dale Clayton describe how birds defend themselves against ectoparasites by choosing a healthy-looking (parasite-free) mate, good personal hygiene (regular plumage and body maintenance) and good house cleaning around the nest (yes, they twigged that one). In the penultimate chapter Michael Brooke describes the acquisition of host-specific feather lice by the common cuckoo and its hosts. The last chapter, by Gaden Robinson, entitled 'Moth and bird interactions: guano, feathers and detritophagous caterpillars' describes the biology of nest-dwelling Lepidoptera with some very familiar examples from Britain. Artificial nests can be used to monitor these moths in their natural environment. This is something members of the Society should obviously try for themselves. Artificial nests can be made from a handful of feathers (usually from domestic chickens or pluckings from game) enclosed in rot-resistant fabric netting (black fishnet stockings are perfect apparently) and hung in a hedgerow or tree to see what comes along.

I preferred some chapters more than others but they were all interesting. The real beauty and strength of the book is that it brings together a vast amount of literature on the interactions between insects and birds. If you ever wish to know how frequently, when and where (and even why) a particular insect has been acquired as a food item by a bird then this is the place to start reading.

John Badmin

THE SOCIETY'S PUBLIC LIABILITY INSURANCE

In 1997 the Society extended its third party liability insurance for cover in respect of official Society events to include field work carried out by members as part of their personal activities. It was expected that this would cover the insurance obligations, which accompany applications for collecting and recording permits in many cases.

The Society has received a number of queries regarding the scope of the cover provided and this notice will hopefully clarify the position.

At events arranged by the Society and its sister organisations, Dipterists' Forum, BMIG, and BWARS, public liability insurance is in place which covers injury and damage to third parties arising from the activities of members and guests. Events include both field meetings and indoor events such as workshops and exhibitions. The cover provided is £5,000,000. It is important that permits for field meetings are issued in the name of the Society, or sister organisation, or to an individual on behalf of the Society, not in the name of the leader of the meeting.

The Society's insurance policy also provides £5,000,000 of public liability insurance to individual members of the Society and sister organisations, in respect of their own field work and entomological research which is not part of a Society activity, providing this is undertaken in the United Kingdom and is not carried out with a view to financial reward.

Members who are contemplating carrying out field work on a paid basis are specifically excluded from this cover. We have now procured an arrangement by which such members can approach our brokers directly to obtain individual third party liability cover under our policy. This will incur the payment of an additional premium by the member concerned. We understand this will result in a very marked saving compared with obtaining this cover through a fresh policy.

We must emphasise that the cover referred to above is Public Liability Insurance and does not include Professional Indemnity, for which separate arrangements have to be made.

The Society's insurance policy number is,

Royal Insurance H2/RKE274258-7.

Our brokers are,

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COTESIA CAMERON (HYMENOPTERA: BRACONIDAE: MICROGASTRINAE) PARASITOIDS OF HELICONIINAE (LEPIDOPTERA: NYMPHALIDAE) IN EUROPE, WITH DESCRIPTION OF THREE NEW SPECIES

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Abstract

Taxonomic investigation of specimens of *Cotesia* in the National Museums of Scotland (NMS) that are firmly known to have been reared (gregariously in each case) from species of Heliconiinae in Europe has revealed three species. Although in two cases there are literature citations to these taxa, it is shown that the *Cotesia* species had been misidentified in both cases and all three are described here as new species, ***C. selenevora* sp. nov.**, ***C. eunomiae* sp. nov.** and ***C. adippevora* sp. nov**. A key is given for their separation, although they are not believed to be closely related.

Introduction

Species of *Cotesia* Cameron (Hymenoptera: Braconidae: Microgastrinae), which are koinobiont parasitoids of Lepidoptera larvae and mostly (though not exclusively) attack "macrolepidoptera", are likely to be familiar to anyone rearing wild-collected caterpillars of butterflies in Europe, as *Cotesia* has strongly colonised that group and the genus is one of their principal enemies (Shaw, Stefanescu & Nouhuys, 2009). On the whole, *Cotesia* species tend to have narrow host ranges, often spanning no more than a few closely related host species, and (at least locally) monophagy is not uncommon. In some species-groups of *Cotesia* close aggregates of species, each parasitising one or a few species within a tight host group, may be morphologically virtually indistinguishable. An example is seen in two clades of *Cotesia* species parasitising Melitaeini (Nymphalidae: Nymphalinae) in Eurasia, as revealed by molecular genetic studies (Kankare & Shaw, 2004; Kankare *et al*., 2005; Kankare, Nouhuys & Hanski, 2005).

Cotesia species may be gregarious or solitary with respect to their host larva. Oviposition is usually into fairly early instar hosts (in some cases well-developed first instar larvae can be attacked even before they leave the egg), and the endoparasitic larvae develop as koinobionts – that is, while the host continues to develop. When fully grown, the parasitoid larvae erupt from the host larva – which may or may not be fully grown – and form their small cocoons on, below or near the stricken host remains. Most often, the host does not die immediately, and in some cases its subsequent behaviour contributes to the wellbeing of the parasitoids, although in others the stricken host is quiescent. Although most *Cotesia* species, and hence their cocoons, are similarly-sized (individual cocoon lengths about 4 mm) the colour, degree of attachment to one another in the case of gregarious species, and sometimes other structural peculiarities of the cocoon, are often highly characteristic for particular species.

Most *Cotesia* species that parasitise European butterflies pass the winter as first instar larvae inside overwintering hosts, but a few do so as prepupae within cocoons that may be structurally toughened to withstand an existence of ten or eleven

months. A very few *Cotesia* species are known to be capable of passing the winter in either state, depending on the host they are using, and some *Cotesia* species are able to develop two or even three generations on a single host generation by attacking successively later instar larvae of their host. A small number of *Cotesia* species with particularly wide lepidopteran host ranges use butterfly caterpillars at only certain times of year, or in an only occasional and non-obligatory way, but extreme specialisation is much more usual. If the cocoons emerge in the summer of their formation, development to the adult stage is rapid (in warm weather) and adult emergence within a week of cocoon formation is not unusual.

In this paper three European species of *Cotesia* that parasitise species of Heliconiinae (Nymphalidae) are discussed and described as new. The hosts of two of them occur in the British Isles, but so far none of the three *Cotesia* species has been found here. These *Cotesia* species are probably not closely related to one another.

Taxonomic history and origin of material

From 1965 until 1976 G. E. J. Nixon published extensively on Microgastrinae and his revision (Nixon, 1974) of the N.W. European species of the part of the traditional genus *Apanteles* that was later (Mason, 1981) recognised as *Cotesia* provided a good foundation for species recognition in this genus. One great strength of Nixon's work is that it is based on a rich collection of reared material in BMNH initiated by the previous and systematically intensive approach to the traditional *Apanteles* sensu lato by D. S. Wilkinson (up to his untimely death in 1945), and the latter's private employment for fieldwork of R. L. E. Ford to conduct a great deal of targeted rearing. Subsequent revisions of European Microgastrinae by J. Papp included much work on *Cotesia* (e.g. Papp, 1986, 1987, 1990), in which (especially) substantial nomenclatural changes were made and several additional species were incorporated in the keys, including some that had been described by Russian authors. Unfortunately, however, almost no attention to host data was given (notwithstanding Papp's (1990) subsequent and essentially uncritical compilation). Despite Papp's efforts, considerable difficulty remains in that the many species described from the former USSR in the Russian language (e.g. by N. Telenga and V. I. Tobias) are poorly accounted for in works dealing with Western Europe, with the consequence that considerable undetected synonymy might still exist. It is also undoubtedly the case that a substantial number of European species of *Cotesia* remain undescribed, or are incorrectly in synonymy, often because aggregates of closely similar but biologically distinct species remain unresolved, and taking full account of host relations provides the best and by far the most useful means for further progress on the taxonomy of this large and rather difficult genus.

Papp (1990) produced a host list for European *Cotesia* species but, although he made some effort to "authenticate" records based on whether or not determinations were made by a "specialist", the listings overall are little more than an amalgamation of opinion of uncertain origin and low reliability, and unfortunately published rearing records (though included) are not so-indicated. However, the listings leave little out. Apart from *C. callimone* (Nixon) (see below), the only *Cotesia* species listed as having Heliconiinae among their hosts by Papp (1990) are *C. rubripes* (Haliday), *C. spurius* (Wesmael) and *C. vanessae* (Reinhard), all of which have quite different host ranges (cf. Nixon, 1974), and the records of them as parasitoids of Heliconiinae should be dismissed as almost certainly the results of misidentification.

Nixon (1974) included only one species (*Cotesia callimone* (Nixon), as *Apanteles*) for which he gave a host record from a heliconiine, on the basis of the holotype (and

some of the paratypes, i.e., those from the same brood) of that species stated as being reared from "Arctiid or Argynid" from Ireland and further paratypes from a separate brood labelled as reared from *Argynnis* sp. [but see comment on the meaning of this name below] from Finland. Examination of this material (in BMNH) reveals that the two broods belong to different species and that the host remains accompanying the brood from which the holotype was chosen (whose labelling does not suggest any host at all) are certainly not of a heliconiine nymphalid but rather, in my opinion, belong to a lithosiine arctiid. The Finnish series labelled as from *Argynnis* sp. is conspecific with material described below as ***Cotesia selenevora* sp. nov**. from two broods reared by C. Turlure and J. Choutt from *Clossiana selene* (Denis & Schiffermüller) at different sites in Belgium, and the Finnish specimens misidentified by Nixon (1974) as his new species *Cotesia callimone* (as *Apanteles*) are included as paratypes of the new species described below.

A study on parasitism of the heliconiine *Proclossiana eunomia* (Esper) in Belgium (Waeyenbergh & Baguette, 1996) revealed an abundance of a gregarious *Cotesia* species that was identified in that publication as *Cotesia vestalis* (Haliday), at the time suggested (erroneously) as a senior synonym of *Cotesia cynthiae* (Nixon), a parasitoid known from the high-alpine melitaeine nymphalid *Euphydryas cynthia* (Denis & Schiffermüller) with which the parasitoid reared from *P. eunomia* was incorrectly believed to be conspecific. [Although that tentative synonymy offered by a taxonomist as a pers. comm. to those authors was never formally proposed, another parasitoid of Melitaeini, *C. melitaearum* (Wilkinson), was formally (but erroneously) treated as a junior synonym of *C. vestalis* subsequently (van Achterberg, 1997). The identity of *C. vestalis* (a solitary species and not conspecific with any parasitoid of Melitaeini) was eventually clarified by Shaw (2003)]. There are many clear differences that separate *Cotesia cynthiae* from the *Cotesia* parasitoid of *Proclossiana eunomia* and the latter is described below as ***Cotesia eunomiae* sp. nov**. from material reared by J. Choutt and by P. J. C. Russell from four sites in Belgium (including the one sampled by Waeyenbergh & Baguette).

A gregarious *Cotesia* species reared by me from *Argynnis adippe* (Denis & Schiffermüller) in alpine N. Italy is also apparently undescribed. In Nixon's (1974) key it runs closest to *Cotesia setebis* (Nixon) (as *Apanteles*), but it does not agree with the holotype (from arctic Sweden) of that species, and (as with the previously discussed species) no better fit results from running it in keys given by Papp (1986, 1987, 1990) and Tobias & Kotenko (1986). As far as I can ascertain no *Cotesia* parasitoid has been recorded from this host, and accordingly it is here described as ***Cotesia adippevora* sp. nov**. A further series (in less good condition) previously reared by M. Kuussaari and J. Paukkunen from *A. adippe* in Finland is included as paratypes but a series reared from *Argynnis aglaja* (Linnaeus) from the same site in Finland is excluded from the type series, although it is morphologically similar and probably conspecific, mainly because of its poor condition but partly also in recognition of the sometimes extreme host specificity of *Cotesia* species parasitising even very closely related hosts.

Descriptions of new species and biological notes

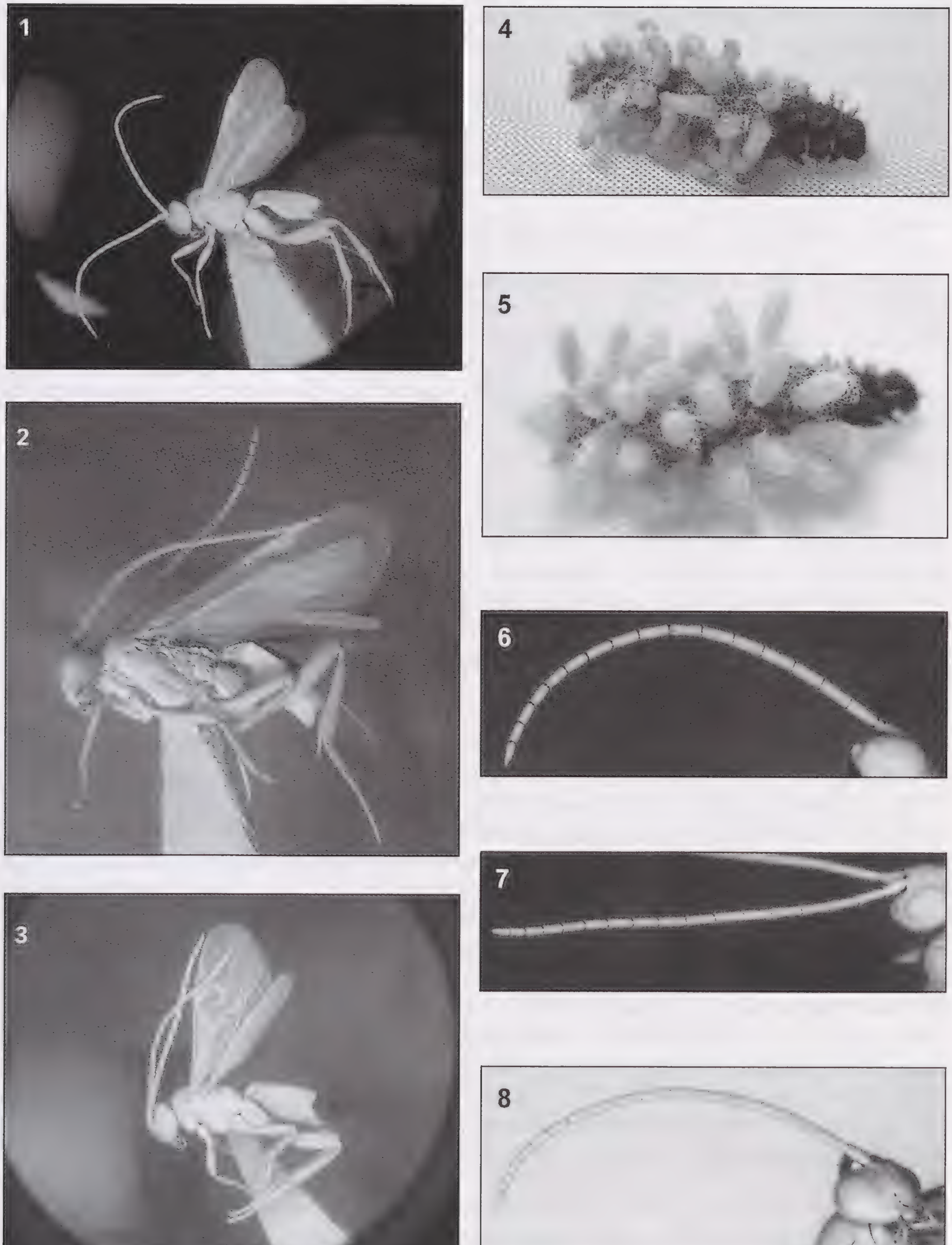
To facilitate integration with his work, terminology follows Nixon (1965,1974) except that pterostigma is used in place of stigma and metasoma is used in place of gaster; see also Mason (1981) and Shaw (2007) who include notes on recognition of the genus. In the first description (only) further notation of wing venation and cells according to van Achterberg (1993) have been added in normal brackets, and

according to Shaw & Huddleston (1991) in square brackets. The distal end of the pterostigma is taken as the projection of its lower outer boundary to the wing margin; veins are measured to the midpoint of vein junctions; and the height of the discal cell is measured from the junction of the first and second abscissae of the discoideus. POL refers to the distance between the posterior ocelli and OOL to the distance between a posterior ocellus and the adjacent compound eye.

Scanning electron micrographs were taken on a CamScan MX 2500 (15 kV; spot size 2). NB: some of the images give deceptive impressions of dimensions, as out-of-plane parts remain in good focus; e.g. compare Figs 18 and 19.

Cotesia selenevora sp. nov. (Figs 1, 6, 9, 13, 16, 20 & 24)

Holotype, ♀. Length, 2.6 mm. Head in dorsal view (Fig. 24) 1.8 times as wide as long, abruptly roundly narrowing behind eye and clearly widest at eyes, temple 0.8 times as long as eye; face (excluding clypeus) 1.3 times as wide as high, rugulose to weakly rugose-punctate; frons with very weak microsculpture; vertex centrally broadly shiny, rugulose to weakly rugose-punctate at sides; ocelli in a low triangle (Fig. 24), imaginary tangent to posterior pair just touching anterior ocellus, POL 2.3 times diameter of posterior ocellus, distance between anterior and posterior ocellus 0.9 times diameter of posterior ocellus, OOL 2.5 times diameter of posterior ocellus; eyes just extending to level of upper margin of clypeus, weakly convergent; malar space 1.4 times basal width of mandible; antenna (Fig. 6) longer than body, fourth segment about 3.0 and penultimate segment about 2.1 times as long as wide. Mesoscutum dull, strongly rugose-punctate, this sculpture strongest posteriorly where the notaulic courses coalesce and the punctures are fairly distinct, but punctures also distinct anteriorly, extreme hind margin rather smooth and shiny; prescutellar sulcus wide with about 6–8 large fovea, scutellum thereby rendered rather small, a little less dull than mesoscutum, more or less rugose and even anteriorly with a shallow punctate element scarcely evident, phragma of scutellum concealed (Fig. 16); mesopleuron strongly punctate anteriorly where matt, precoxal sulcus depressed and rather strongly crenulate, below this rugulose-punctate, moderately shiny; mesosternum more weakly rugulose-punctate, more shiny. Fore wing (Fig. 9) with pterostigma 2.9 times as long as high, emitting radius (*r*) [2*r*–*rs*] well distal to middle (0.7), metacarp (1–R1) [R] as long as pterostigma and 2.5 times as long as its distance from the apex of the radial cell ([marginal cell]); junction of first abscissa of radius and transverse cubitus (2–SR) [1Rs] externally a (quite abrupt) curve, with neither a sharp angle nor a stub; first abscissa of discoideus (1–CU1) [1Cu] 0.95 times as long as second (2–CU1) [1m–cu], discal cell ([1st discal cell)] 1.25 times as wide as high; setae of median cell ([basal cell]) hardly reduced near medius (M + CU1) [M + Cu]. Hind wing with cubitellan cell 2.2 times as long as wide, and vanal lobe (plical lobe) with a distinct and moderately long hair fringe. Hind coxa dull, rugulose to rugose-punctate below and apically striate above, with large shallow punctures on outer face; hind femur 3.8 times as long as wide; inner hind tibial spur only a little longer than outer and obviously reaching beyond middle of hind basitarsus (Fig. 13). Apical segment of fore tarsus without a preapical curved spine below. Propodeum (Fig. 16) coarsely rugose but the median carina distinct in most specimens. Metasoma (Fig. 16) with first tergite widening towards apex, slightly incurving at extreme apex, about 0.9 times as long as wide; basal field practically co-extensive with second tergite, 2.4 times as wide as long, lateral sulci almost obliterated, sculpture of apical part of first tergite and second tergite similar, coarsely rugose with very little longitudinal element; part of tergites 2 + 3 posterior to



Figs 1–8, *Cotesia* species. 1–3, habitus. 4, 5 host larva with (4) erupting parasitoids and (5) ensuing cocoons. 6–8, antenna (7 with head orientated to show malar space). 1, 6 ♀ *C. selenevora* sp. nov.; 2, 4, 5, 7 ♀ *C. eunomiae* sp. nov.; 3, 8 ♀ *C. adippevora* sp. nov.

foveolate margin of basal field mostly matt, rugulose in anterior half becoming granular then narrowly shiny at apex and about 1.2 times as long as basal field; third tergite moderately densely and evenly setose except anteromedially; hypopygium (Fig. 20) rather roundly becoming right-angled apically, not protruding beyond apex of metasoma, 0.43 times as long as hind tibia, the ovipositor sheaths somewhat protruding.

Black; mouthparts dark brown, palpi yellowish; all legs except coxae and most of trochanter (but including trochantellus) orange-brown, the hind femur somewhat and gradually below and at apical 0.4, hind tibia slightly at apex and hind tarsus more strongly infuscate; venter and side of metasoma basally extensively yellow-orange. Tegula dark brown, wing membrane slightly brownish, pterostigma rather light brown, venation yellowish to light brown.

Male: like female except for sexual differences. Legs a little darker.

Material examined: Holotype ♀ "BELGIUM: Luxembourg, Pisserotte. Ex Clossiana selene [coll.]12.6.[20]05, 7 ♀ 8 ♂ em. 25.6.05 C. Turlure" (in National Museums of Scotland, Edinburgh). Paratypes: 6 ♀ 8 ♂ (with cocoons and host remains), same data as holotype (in NMS except 1 ♀ 1 ♂ in BMNH, London, 1 ♀ 1 ♂ in Nationaal Naruurhistorich Museum, Leiden and 1 ♀ 1 ♂ in Hungarian Natural History Museum, Budapest); 3 ♀ (from one brood of unknown size), Belgium, Luxembourg, Libin, ex *Clossiana selene*, coll. 19.v.2008, cocoons 26.v.2008, em. 16.vi.2008 (*C. Turlure & J. Choutt*) (in NMS); 1 ♀ 2 ♂ (with cocoons) [Finland] "Kärret Wom, Tvarminne by, Ur Argynnis sp. larv (in coll Luther) p. 13.vi–20.vi.1333// Alex Luther// Apanteles callimone Nixon Paratypes, 1974//Not conspecific with type of A. callimone Nix. det. M. R. Shaw, 2006" (seen in BMNH, but 1 ♀ 3 [sic] ♂ stated by Nixon (1974) to be in Helsinki Museum).

Variation. In the paratypes from Finland the median carina on the propodeum is obscured.

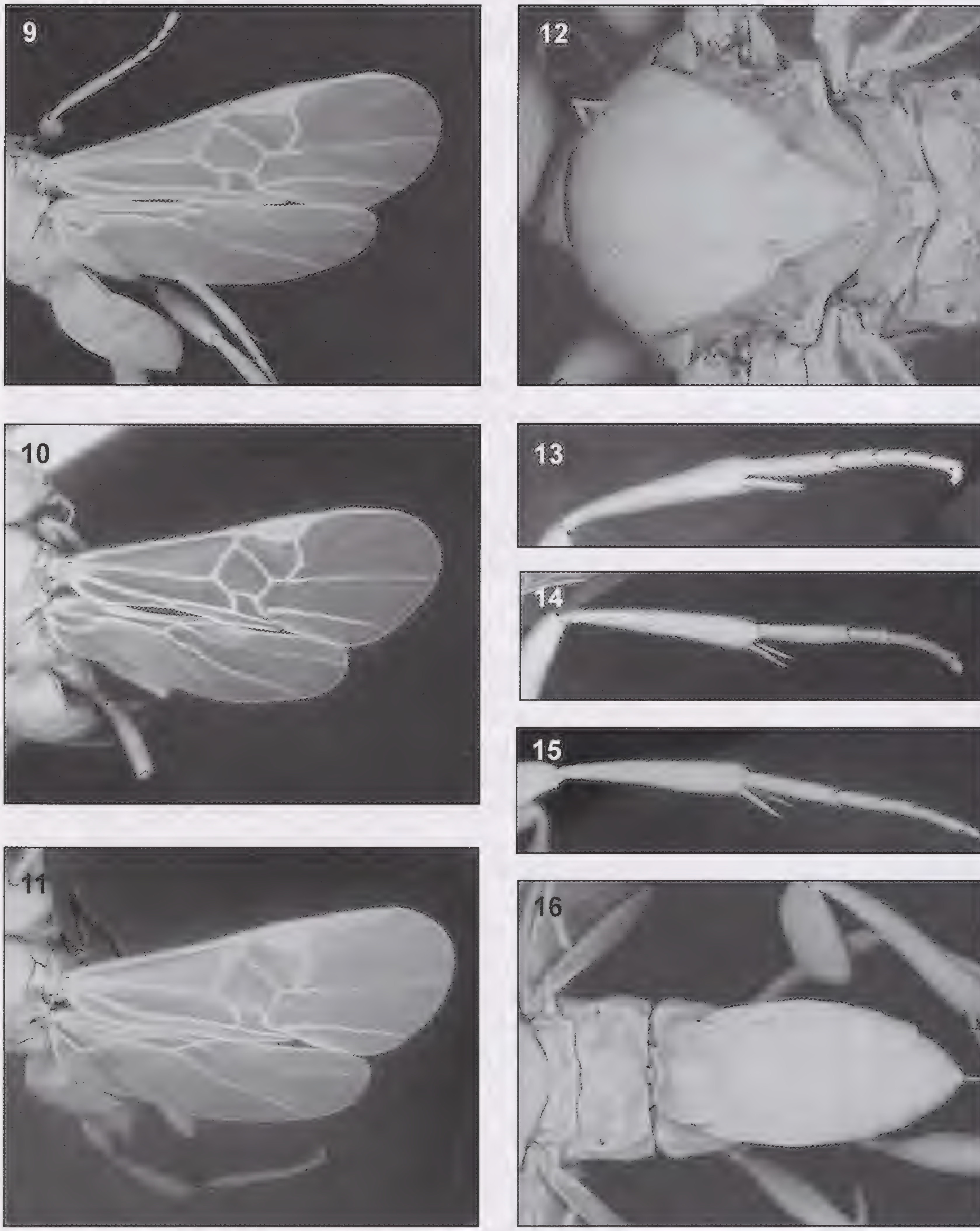
Cotesia selenevora sp. nov. would key in Nixon (1974) to his new species [*Apanteles*] *callimone*, which was described from two reared series: one of 4 ♀ (including the holotype) and 1 ♂ from Glenageary [not Glengeary as in Nixon, 1974], Ireland, reared "ex Arctiid or Argynid" according to Nixon (1974), and a further series of 1 ♀ 3 ♂ from Finland labelled as reared ex *Argynnis* sp. The holotype of *Apanteles callimone* is mounted with an adpressed cocoon mass of (estimated) 5 or 6 white cocoons within a frail host cocoon incorporating many long hairs, on top of which are the (? extracted and replaced) host remains, which are very clearly not those of a nymphalid but rather appear to belong to a lithosiine arctiid. The labelling (entirely in Nixon's hand apart from standard BMNH labelling) is "Ireland, Co. Dublin, Glenageary, E. Baynes//BM.TYPE HYM 3c 1896//Apanteles callimone Nix. Type ♀". The remainder of this reared series (3 ♀ 1 ♂) is mounted on a single card (from which the card carrying the holotype appears to have been cut) with similar (but paratype) labelling. Nothing in the labelling relates to the host's identity; the suggestion that it might have been a heliconiine nymphalid – i.e. "[Arctiid or] Argynid" – evidently came from Nixon rather than the rearer. The paratypes of *Apanteles callimone* Nixon from Finland, of which 1 ♀ 2 ♂ are present in BMNH at the time of writing (*pace* Nixon, 1974), labelled as reared from *Argynnis* sp. (but lacking host remains) are not conspecific with the holotype, but rather belong to *Cotesia selenevora* sp. nov. and are here treated as paratypes of that. It should be borne in mind that at the time the material was reared "*Argynnis*" was used in a broad sense that would encompass *Clossiana*. There are numerous differences between *C. selenevora* sp. nov. and *C. callimone*, which has the head much less strongly narrowed behind the eyes, the scutellum more sharply punctate and shiny,

the first abscissa of the radius sharply angled externally at its junction with the transverse cubitus and with an evident stub (of 3–SR) [2Rs], a shorter first abscissa of the discoideus in relation to the second (about 0.65:1), and the third tergite more strongly sculptured. In addition the hind tibial spurs of *C. callimone* are even (slightly) longer and more strongly unequal, but this difference is less easy to appreciate.

Cocoons bright yellow (presumably faded in the Finnish material which are pale yellowish-buff), formed in small loosely connected groups and tending to become scattered in the wake of the still actively walking host (C. Turlure, pers. comm.).

Cotesia eunomiae sp. nov. (Figs 2, 4, 5, 7, 10, 12, 14, 17, 21 & 23)

Holotype, ♀. Length 2.4 mm. Head in dorsal view (Fig. 23) 1.7 times as wide as long, roundly narrowing behind eye, temple 0.8 times as long as eye; face (excluding clypeus) 1.4 times as wide as high, centrally largely matt, rugulose to weakly rugose-punctate, less sculptured and more shiny towards eyes, boundary between face and clypeus well marked; frons and vertex more or less rugulose and greasy looking; ocelli rather large, in a high triangle (Fig. 23), imaginary tangent to posterior pair clearly not touching anterior ocellus, POL 1.4 times diameter of posterior ocellus, distance between anterior and posterior ocellus 0.8 times diameter of posterior ocellus, OOL 2.0 times diameter of posterior ocellus; eyes not quite extending to level of upper margin of clypeus, divergent below middle of face; malar space 1.4 times basal width of mandible; antenna (Fig. 7) slender, longer than body, fourth segment about 3.2 times and penultimate segment about 2.2 times as long as wide. Mesonotum (Fig. 12) with mesoscutum dull, strongly rugose-punctate, the punctures clearest anteriorly and tending to become overwhelmed by rugosity where the notaulic courses coalesce posteriorly, hind margin becoming smoother and more shiny; prescutellar sulcus (Fig. 12) wide with about 6–8 large fovea, scutellum thereby rendered small, also dull, strongly rugose with punctate element weak, phragma of scutellum more or less concealed (Figs 12, 17); mesopleuron rugose anteriorly and especially so below the wide and shallow precoxal sulcus, often rendering it indistinct; mesosternum rugulose-punctate and similarly dull. Fore wing (Fig. 10) with pterostigma 2.8 times as long as high, emitting radius distal to middle (0.65); metacarp as long as pterostigma and 2.4 times as long as its distance from apex of radial cell; junction of first abscissa of radius and transverse cubitus externally weakly angled; first abscissa of discoideus 0.95 times as long as second, discal cell 1.18 times as wide as high; setae of median cell hardly reduced near medius. Hind wing with cubitellan cell 2.1 times as long as wide, and vanal lobe with a distinct and moderately long hair fringe. Legs rather slender, hind coxa dull, coarsely rugose to rugose-punctate above and at sides, more weakly below; hind femur 3.9 times as long as wide; hind tibial spurs short, subequal and clearly not reaching middle of hind basitarsus (Fig. 14). Apical segment of fore tarsus without a preapical curved spine below. Propodeum (Fig. 17) very coarsely rugose but the median carina distinct in most specimens. Metasoma (Fig. 17) with first tergite roundly widening towards apex, incurving at extreme apex, about 0.9 times as long as wide; second tergite about 2.7 times as wide as long, densely sculptured all over but with wide sunken foveolate sulci more or less defining a smaller basal field in some individuals; first and second tergites with similar very coarsely rugose sculpture lacking a clear longitudinal element; posterior part of tergites 2+3 posterior to foveolation behind basal field about 1.2 times as long as basal field and more or less coriaceous and dull, often across the whole surface or becoming weakly shiny



Figs 9–16. *Cotesia* species. 9–11, wings. 12, mesosoma, dorsal view. 13–15, hind tibia and tarsus. 16, part of mesosoma and metasoma with tergites 2–3 in plane. 9, 13, 16 ♀ *C. selenevora* sp. nov.; 10, 12, 14 ♀ *C. eunomiae* sp. nov.; 11, 15 ♀ *C. adippevora* sp. nov.

posteriorly; third tergite with setae more or less restricted to a band across the posterior half, sometimes with setae forward of that at sides; subsequent tergites smooth and shiny; hypopygium (Fig. 21) short, its ventral profile often slightly concave, subtruncate at apex where about right angled, hardly or not protruding beyond apex of metasoma, about 0.5 times as long as hind tibia but its base often partly concealed by the enlarged laterotergites, ovipositor and sheath usually fully concealed.

Black; mouthparts, all legs except coxa and most of trochanter (but including trochantellus) more or less honey-brown but hind femur darker, often except for a central and basal flush dark brown or blackish; venter and side of base of metasoma only a little lightened. Tegula dark brown, wing membrane slightly brown, venation including pterostigma pale yellowish brown.

Male: like female except for sexual differences. Hind femur often not as dark.

Material examined: Holotype ♀ "BELGIUM: Luxembourg, Pisserotte. [Ex] Proclossiana eunomia [coll.] 26.5.05, cocs 30.5.05, em 22.6.2005 [brood of] 42 (22 ♀ 15 ♂ [emerged]) J. Choutt" (in National Museums of Scotland, Edinburgh). Paratypes: 21 ♀ 15 ♂ (with cocoons and host remains), same data as holotype (in NMS except 1 ♀ 1 ♂ in BMNH, London, 1 ♀ 1 ♂ in Nationaal Naruurhistorich Museum, Leiden and 1 ♀ 1 ♂ in Hungarian Natural History Museum, Budapest); 21 ♀ 2 ♂ (with cocoons), data as above except coll. v.05, cocs 31.v.05, em. vi.2005, 34 (21 ♀ 2 ♂ em.); 16 ♀ 7 ♂ (with cocoons and host remains), data as above except coll.19.v.05, cocs 29.v.05, em. 23.vi.2005, 41 (16 ♀ 7 ♂ em.); 12 ♀ 3 ♂ (with cocoons), data as above except cocs coll. 7.vi.05, em. vi.2005, 32 (12 ♀ 3 ♂ em.); 13 ♀ 3 ♂ (with several cocoon clusters), data as above except [coll. and] em. vi.2004, [parts of] several gregarious broods; 2 ♂, data as above except coll. and em. 2008; 27 ♀ 3 ♂ (with cocoons and host remains), Belgium, Liege, Prés de la Lienne, ex *Proclossiana eunomia* coll. 25.v.05, cocs 29.v.05, em. vi.2005, 50 (27 ♀ 3 ♂ em.) (*J. Choutt*); 2 ♀, Belgium, Luxembourg, Tailsus, ex *Proclossiana eunomia* coll. and em. 2008 (*J. Choutt & C. Turlure*); 4 ♀ 1 ♂ (extracted from cocoons; with cocoons and host remains), Belgium, Luxembourg, Cetturu, ex *Proclossiana eunomia* coll. v.1997, cocs v.97, brood of 33 failed to em. (*P. J. C. Russell*) (the foregoing all in NMS).

Variation. The hind femur varies from almost black to honey-brown more or less infuscate above and below. The position of the radius on the pterostigma is sometimes less distal (down to about 0.58). Third tergite sometimes with setae more widely distributed, and its sculpture varies from weakly coriaceous only in the anterior half to strongly so and matt over the whole tergite.

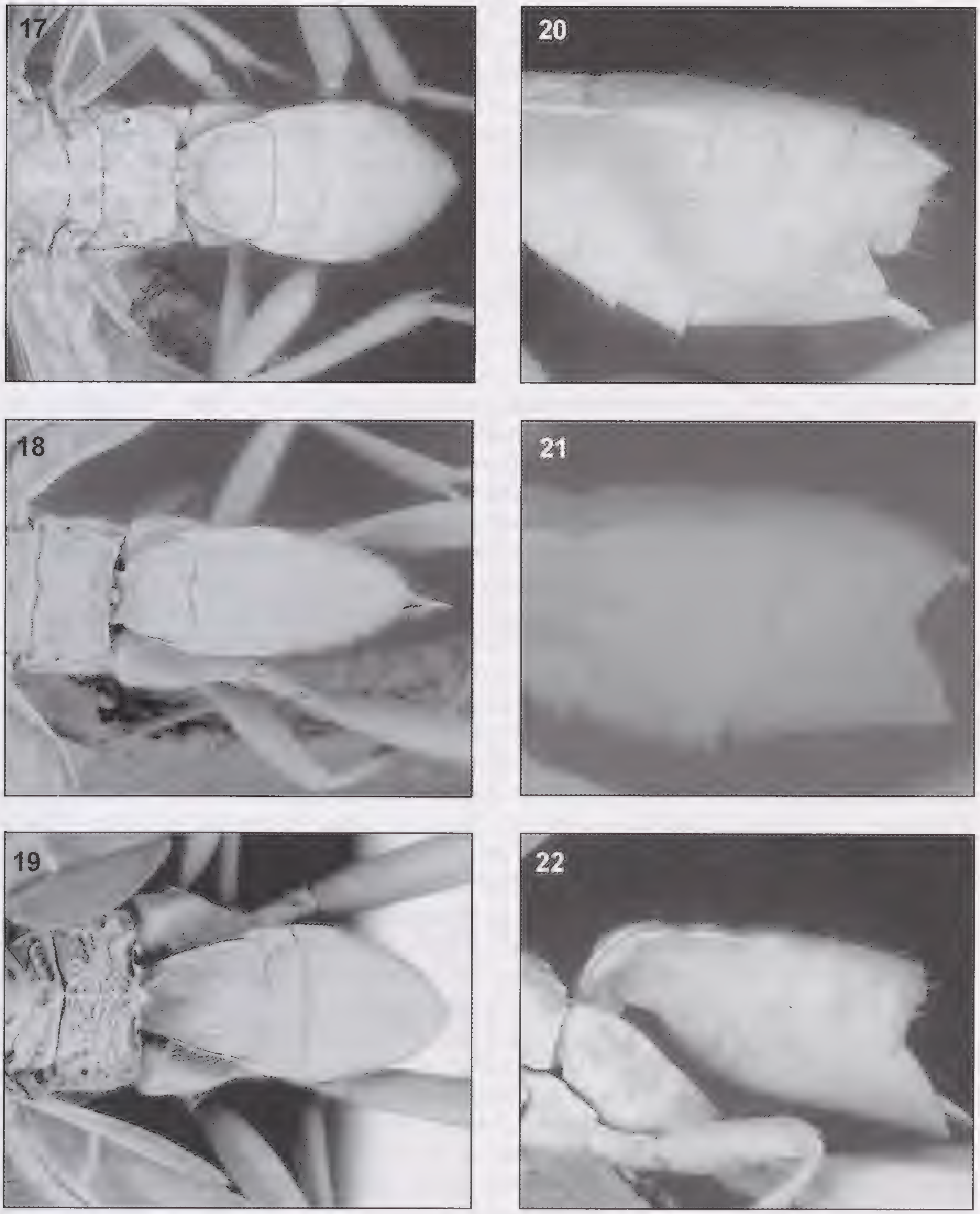
Cotesia eunomiae sp. nov. runs smoothly in Nixon's (1974) key to couplet 9, but then founders, and it is profoundly different from all species with which it might be compared. It has been confused in the past (Waeyenbergh & Baguette, 1996; and see above) with the species correctly known as *Cotesia cynthiae* (Nixon) but among many differences that species has the ocelli in a low triangle, the prescutellar groove narrower with more fovea, the mesoscutum and larger scutellum more coarsely sculptured (reticulate-punctate), a considerably longer hypopygium, and the metasoma laterally compressed apically. It is similar to *Cotesia villanus* (Reinhard) in the arrangement of the ocelli, but among many characters that species differs in its less transverse head with smaller eyes, shorter and stouter antennae, shorter metacarp, longer and more acute hypopygium, and larger and more distinctly punctate scutellum.

Cocoons identical in all material examined: bright strong yellow, usually in broods of about 30–50 ex final instar larvae, weakly adhering to one another and remaining aggregated. The whole brood of larvae erupts in concert (Fig. 4), and initially the

cocoons are constructed around the yet mobile host (Fig. 5), which normally subsequently frees itself from the cocoons and moves away before dying (Waeyenbergh & Baguette, 1996). These authors, as also J. Choutt (pers. comm.) working at the same site a decade later, record very high levels of parasitism in final instar host larvae found exposed, but it is not clear whether this is a result of altered host behaviour and/or retardation of parasitised individuals, or a true reflection of the level of parasitism in the population. It is also unknown whether the parasitoid may have two annual generations on the single host generation; a trait seen in several *Cotesia* species whose hosts overwinter as larvae that can contribute to high levels of parasitism in the final instar. Poor emergence rates in the captive broods seen is almost certainly an artefact resulting from the use of small airtight containers.

Cotesia adippevora sp. nov. (Figs 3, 8, 11, 15, 18, 19, 22 & 25)

Holotype, ♀. Length 2.4 mm. Head in dorsal view (Fig. 25) 1.7 times as wide as long, initially slightly produced but then gradually roundly narrowing behind eye, temple 0.7 times as long as eye; face (excluding clypeus) 1.3 times as wide as high, rugulose; frons rather smooth and shining; vertex feebly sculptured, subshiny; ocelli in a low triangle (Fig. 25), anterior ocellus almost touched by imaginary tangent to posterior pair, POL 2.3 times diameter of posterior ocellus, distance between anterior and posterior ocellus 1.0 times diameter of posterior ocellus, OOL 2.2 times diameter of posterior ocellus; eyes extending to level of upper margin of clypeus, moderately convergent; malar space 1.0 times basal width of mandible (Fig. 8); antenna (Fig. 8) slender, longer than body, fourth segment about 2.9 times and penultimate segment about 2.0 times as long as wide. Mesoscutum rather dull, distinctly but shallowly rugose-punctate, most strongly along notaulic courses, more coarsely so posteriorly except at extreme hind margin where becoming smooth and dull; prescutellar sulcus moderately narrow, with at least 10–12 fovea, scutellum not reduced in size, less clearly punctured and more shiny than mesoscutum, phragma of scutellum concealed (Fig. 19); mesopleuron clearly punctate anteriorly, precoxal sulcus depressed and weakly foveolate, below this matt and coriaceous; mesosternum rather shiny. Fore wing (Fig. 11) with pterostigma 2.5 times as long as high, emitting radius a little distal to middle (0.55); metacarp 0.9 times as long as pterostigma and 1.8 times as long as its distance from apex of radial cell; junction of first abscissa of radius and transverse cubitus externally sharply angled; first abscissa of discoideus 0.85 times as long as second, discal cell 1.17 times as wide as high; setae of median cell only slightly reduced near medius. Hind wing with cubitellan cell 2.2 times as long as wide, and vanal lobe with a distinct but centrally rather short hair fringe. Hind coxa rather smooth and matt at side, more (sub)shiny below with weak sculpture, striate apically and basally weakly rugose-punctate above; hind femur 3.5 times as long as wide; inner hind tibial spur longer than outer and reaching to middle of basitarsus. Apical segment of fore tarsus without a preapical curved spine below. Propodeum (Figs 18, 19) moderately coarsely rugose but with median carina distinct in most specimens (only anteriorly in some). Metasoma (Figs 18, 19) with first tergite widening towards apex, as long as wide; second tergite with basal field not co-extensive, transverse, 2.4 times as wide as long, lateral sulci distinct, curved; sculpture of both apical part of first tergite and basal field rather finely rugose with a strong longitudinal element; part of tergites 2 + 3 posterior to foveolation behind basal field almost smooth (dull but scarcely sculptured anteriorly), mostly shiny and ca. 1.4 times as long as basal field; third tergite almost evenly (except medially) but rather sparsely setose; hypopygium (Fig. 22) wedge shaped, acute, angled at about 60°, extending beyond



Figs 17–22. *Cotesia* species. 17, 18, part of mesosoma, and metasoma with tergites 2–3 in plane. 19, the same, tergite 1 in plane. 20–22, metasoma, lateral view. 17, 21 ♀ *C. eunomiae* sp. nov.; 18, 19, 22 ♀ *C. adippevora* sp. nov.; 20 ♀ *C. selenevora* sp. nov.

apex of metasoma and about 0.75 times as long as hind tibia, the ovipositor sheaths slightly protruding.

Black; mouthparts dark brown, palpi basally brownish becoming yellowish apically; all legs except coxa and most of trochanter (but including trochantellus) honey-brown, the mid and hind femur gradually but extensively much darker above, below and towards apex; hind tibia and tarsus obscurely infuscate apically; hind tibial spurs and venter and side of metasoma basally yellowish. Tegula dark brown; wing membrane weakly brownish; venation including pterostigma brown but costa basally markedly yellow grading to brown at its apex.

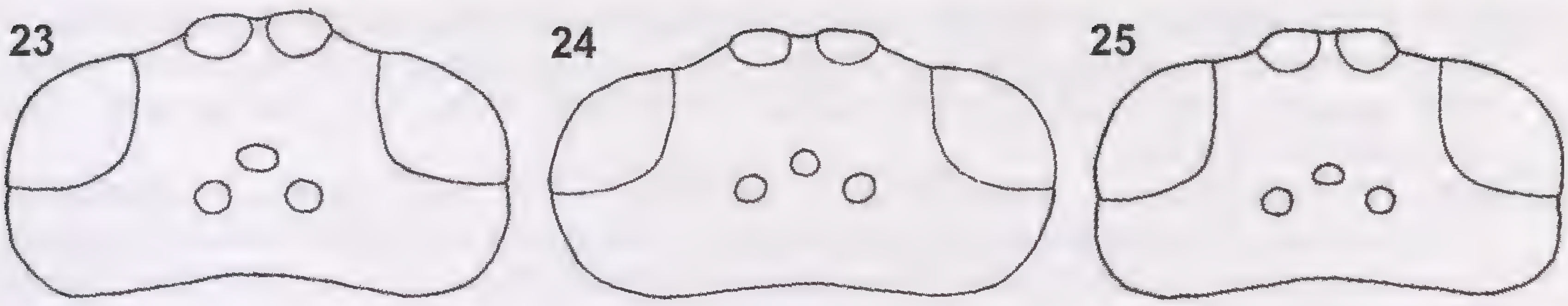
Male: like female except for sexual differences. Legs a little darker.

Material examined: Holotype ♀ "ITALY: S. Tyrol. W of Burgeis 1450 m [ex] Argynnis adippe 11.7, P[arasitoid] L[arvae] E[Erupted] 12–14.7.04, em. 21–23.7.[20]04 brood [of] 36 (25 ♀ 9 ♂ em) M. R. Shaw" (in National Museums of Scotland, Edinburgh). Paratypes: 22 ♀ 8 ♂ (with cocoons and host remains), same data as holotype (in NMS except 1 ♀ 1 ♂ in BMNH, London, 1 ♀ 1 ♂ in Nationaal Naruurhistorich Museum, Leiden and 1 ♀ 1 ♂ in Hungarian Natural History Museum, Budapest); 10 ♀ 4 ♂ (all in poor condition, with cocoons) Finland (S.), Lapinjärvi, ex *Argynnis adippe* coll. 8.vi.1996, brood of ca. 15 (*M. Kuussaari & J. Paukkunen*). Non-paratype material: 15 ♀ 28 ♂ (all in poor condition, with cocoons) Finland, same data but ex *Argynnis aglaja* and brood of ca. 50.

Variation. The paratypes from Finland are slightly more heavily sculptured, the metacarp is 2.5 times as long as its distance from the apex of the radial cell, and the preapical antennal segment is a little shorter. In the non-paratype series ex *A. aglaja* the hind femur tends to be more strongly darkened (almost black except centrally towards the base) and the mesopleuron tends to be shiny below the precoxal suture. In this brood there is considerable size variation.

Cotesia adippevora sp. nov. could be run either way in the sometimes difficult couplet 2 of Nixon's (1974) key. If run through couplet 3 it comes closest to *Cotesia* (as *Apanteles*) *setebis* (Nixon), a little-known species described from non-reared material collected on mountains in arctic Sweden and at high altitude in Switzerland. The type material of *C. setebis* (examined) is rather variable, but the holotype differs from *C. adippevora* sp. nov. in several respects; *C. setebis* is a more heavily built species, with a less transverse head (i.e. longer temple), stouter antenna (especially towards the base), the mesopleuron and hind coxa more strongly sculptured and less shiny, legs more robust, hind tibial spurs stouter and a little longer, fore wing with pterostigma slightly more elongate with *r* issuing more distally, the discal cell wider and the costal vein entirely brown. If it is taken the other way through Nixon's (1974) couplet 2 to couplet 18 it will run – on account of its similarly produced hypopygium – to *C.* (as *A.*) *cajae* (Bouché), an often abundant parasitoid of *Arctia* spp (Arctiidae), and indeed it bears rather a strong likeness to that species. However, *C. cajae* is a somewhat more robust, heavily sculptured and pubescent species, having a longer hypopygium (0.95 times as long as hind tibia), the antenna more robust and shorter, the tibial spurs shorter, and the first metasomal tergite shorter and tending to be more strongly widened apically. The cocoons of the similarly gregarious *C. cajae* are also often scattered singly, as a result of the parasitoid larvae erupting over a period and the host not becoming quiescent initially, but they are generally white to pale pink in colour.

Cocoons identical in all three broods examined: pale lemon yellow, constructed individually and (in the brood from Italy for which it was observed) tending to become scattered in the wake of the actively walking host, the parasitoid larvae erupting singly over a period of at least two days.



Figs 23–25. *Cotesia* species, heads in dorsal view. 23 ♀ *C. eunomiae* sp. nov.; 24 ♀ *C. selenevora* sp. nov.; 25 ♀ *C. adippevora* sp. nov.

Key to females of *Cotesia* species reared from European Heliconiinae

This key is obviously not applicable to specimens of different origin.

1. Hind tibial spurs short, clearly not reaching to middle of hind basitarsus (Fig. 14); ocelli in a higher triangle, imaginary tangent to posterior pair clearly not touching anterior ocellus (Fig. 23) . . . . *eunomiae* sp. nov.
– Hind tibial spurs long, the inner one reaching to middle of hind basitarsus or beyond (Figs 13, 15); ocelli in a lower triangle, imaginary tangent to posterior pair touching anterior one (Fig. 24) or nearly so (Fig. 25) 2
2. Hypopygium (Fig. 22) wedge shaped, acute, angled at about 60° and about three quarters as long as hind tibia; head in dorsal view not narrowing immediately behind eyes (Fig. 25); in fore wing junction of first abscissa of radius with transverse cubitus externally sharply angled (Fig. 11) . . *adippevora* sp. nov.
– Hypopygium (Fig. 20) roundly becoming right angled apically and less than half as long as hind tibia; head immediately behind eyes strongly narrowing (Fig. 24); junction of first abscissa of radius with transverse cubitus rounded on outer side (Fig. 9) . . . . *selenevora* sp. nov.

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APHIS GENTIANAE (BÖRNER) AND *APHIS OCHROPUS* KOCH (APHIDOIDEA) NEW TO BRITAIN

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ABSTRACT

Aphis gentianae (Börner) and *Aphis ochropus* Koch are reported as new to the British fauna. Details are provided concerning host plants, feeding position, attendance by ants and distribution.

INTRODUCTION

Aphids are an under-recorded group in Britain, with the only systematic recording being undertaken by Rothamsted Research, through the operation of their suction traps. Field aphidologists are few and far between, with most records in publications such as Stroyan (1984) dating back many years. Consequently, there is a considerable knowledge gap concerning the diversity, distribution and ecology of many aphid species in Britain, and much scope for new species and host plant associations to be found. Some new colonists may result from importations on plants, but it is likely that overlooked native species remain to be discovered and climate change may result in natural colonization by species from southern and central Europe.

***Aphis gentianae* (Börner) (Aphidinae: Aphidini)**

In July 2007, dark green aphids were collected from subterranean parts of two *Centaurium erythraea* plants growing on calcareous soils at Cosmeston Park, Penarth. The aphids were sheltered and attended by the garden ant *Lasius niger* (L.). Following transferal to alcohol and examination under a 60 × stereomicroscope, the aphids were keyed out using Blackman & Eastop (2006) and a provisional identification of *A. gentianae* was made. The collection was sent to the Food & Environment Research Agency (FERA, formerly CSL) and the Natural History Museum (NHM), where the combined efforts of Sharon Reid (FERA) and Roger Blackman (NHM), confirmed the identity of the aphids as *A. gentianae*.

In July 2007 *A. gentianae* was collected from subterranean parts of *C. erythraea* plants growing at Merthyr Mawr sand dunes and in June 2008, *A. gentianae* was collected from subterranean parts of *Blackstonia perfoliata* growing at Cosmeston Park. In both cases the aphids were attended and sheltered by *L. niger*.

Aphis gentianae may be separated from other aphids feeding on *Centaurium* by its subterranean, ant-attended feeding site, dark green coloration in life, body length of apterae of between 1.2–1.6 mm, weakly developed antennal tubercles and large, well developed marginal tubercles present on abdominal tergites 1–5 and 7 (Blackman & Eastop, 2006). Figure 1 shows a slide mounted apterous female.

Blackman & Eastop (2006) describe *A. gentianae* as being present on Gentianaceae in Central, Southern and Eastern Europe. Fauna Europaea records *A. gentianae* from Austria, Poland, Romania, North West Russia, Slovakia, Ukraine and the former Yugoslavia. Árnyas *et al.* (2009) report the aphid from Hungary. The NHM collection contains material from Italy (R. Blackman, pers. comm.). The presence of *A. gentianae* in Wales represents the first record from Western Europe, but in 2005 a

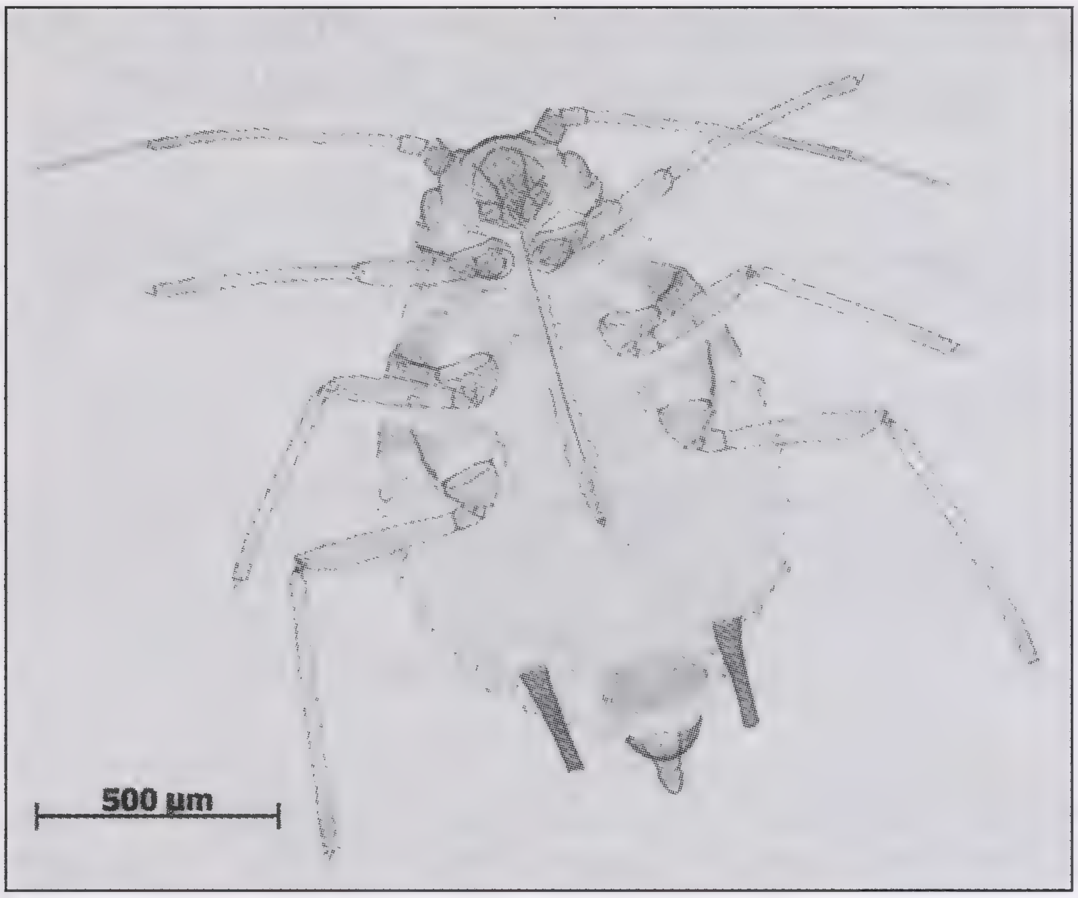

Figure 1. Slide mounted specimen of *Aphis gentianae* (Börner). Photo: courtesy of Sharon Reid (FERA).

relative of *A. gentianae* named *Aphis orocantabrica* (García Prieto & Nieto Nafría) was described from *Gentiana lutea* in Spain (García Prieto & Nieto Nafría, 2005). Work is required to establish more precisely the distribution, host plants and any morphological, genetic or biological differences between specimens of *A. gentianae* collected in different parts of Europe. It seems likely that *A. gentianae* is native to Britain but has been overlooked due to its concealed lifestyle.

***Aphis ochropus* Koch (Aphidinae: Aphidini)**

In July 2007, yellow coloured aphids were collected from subterranean parts and the basal leaflets of two *Dipsacus fullonum* (teasel) plants growing on calcareous soils at Cosmeston Park, Penarth. The aphids were sheltered and attended by the ant *L. niger*. Following transferal to alcohol and examination under a 60 × stereomicroscope, the identity of the aphids was reduced to three possibilities using the key in Blackman & Eastop (2006); *A. confusa* (Walker), *A. ochropus* Koch or *A. thomasi* (Börner). The collection was sent to the Food & Environment Research Agency and subsequently the Natural History Museum, where the combined efforts of Sharon Reid (FERA) and Roger Blackman (NHM) confirmed the identity of the aphids as *A. ochropus*, a species new to the British fauna.

Aphis ochropus was subsequently collected in the summer of 2007 from *D. fullonum* growing on calcareous soils at Dunraven Bay in the Vale of Glamorgan, and from *D. fullonum* growing on 'brownfield' land in Cardiff Bay. In both cases the aphids were feeding on subterranean parts of the plant and basal leaflets, attended by *L. niger*.

Aphis confusa is morphologically similar to *A. ochropus*, but Blackman & Eastop (2006) provide the following points of discrimination in their key to aphids on *Dipsacus*:

The siphunculi of *A. ochropus* are 2.0–2.8 × cauda, whereas the siphunculi of *A. confusa* are 0.8–2.2 × cauda. Rostral segments IV + V of *A. ochropus* are 1.4–1.8 × the length of hind tarsal segment II, whereas the same ratio for *A. confusa* is 1.1–1.4 × HT II. Finally, the ratio of the length of the processus terminalis of antennal segment VI, against the length of the basal part of antennal segment VI, is 2.9–3.7 for

Figure 2. Slide mounted specimen of *Aphis ochropus* Koch.
Photo: courtesy of Sharon Reid (FERA).

A. ochropus and 1.5–3.3 for *A. confusa.* Figure 2 shows a slide mounted apterous female.

Aside from the morphological differences, *A. ochropus* is only known from *D. fullonum*, whereas the usual hosts of *A. confusa* are *Knautia* and *Scabiosa.*

Blackman & Eastop (2006) describe *A. ochropus* as being present on *D. sylvestris* (= *fullonum*) in Germany, Poland and Hungary. Fauna Europaea also lists Bulgaria, Slovakia and Ukraine. It is likely that *A. ochropus* is native to Britain, but has been overlooked due to its concealed lifestyle.

Discussion

Work is required to establish the wider distribution and ecology of *A. gentianae* and *A. ochropus*. Both species feed on host plants that are common throughout Britain, but based on observations in Wales, it is likely that plants growing at sites with free draining soils and high levels of insolation will be favoured. Both species may be considered obligate myrmecophiles, since they have not been observed without ants, though so far in Britain, *L. niger* is the only species of ant observed in attendance.

It is likely that both species are more widely distributed in Europe than the current host country lists indicate. Both species may have been overlooked due to their concealed lifestyle, though in the case of *A. ochropus*, confusion with similar species may have obscured its real distribution. It is possible that the *A. gentianae* reported in the literature may represent more than one species, or sub-species, with variations of morphology or a different genetic make up apparent when specimens are examined from different countries, or from different hosts within the Gentianaceae.

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Thanks are due to Sharon Reid (FERA) and Roger Blackman (NHM) for identifying aphid specimens and transferring them to slides.

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BOOK REVIEW

Centipedes by A. D. Barber. 228pp 216 × 137 mm. Synopses of the British Fauna (New Series), No. 58. Published for The Linnean Society of London by the Field Studies Council, 2009. ISBN 978 185153 2728. Soft back £35.00.

This is a fine replacement for the long out of print, and now very much out of date, *Centipedes of the British Isles* by E. H. Eason published in 1964. It starts with an introduction to centipedes in which every part of the animal is described and clearly illustrated with fine line drawings. This is followed by chapters on Collection and Identification and on Habitats in which to find Centipedes. Next is a Systematic List of British Centipedes, now 60 species strong where there were only 44 in Eason. Then comes a Key to the four Orders of Centipedes recorded from Britain which also includes a tabular key.

The four orders, Geophilomorpha, Lithobiomorpha, Scolopendromorpha and Scutigeromorpha are then dealt with in the Systematic Part (180 pages). Each order has a well illustrated dichotomous key with every key character again illustrated with fine clear line drawings, plus a tabular key. These tabular keys, particularly for the Geophilomorpha are very easy and quick to use. Each species is then described together with line drawings of important characters together with information on distribution. The author states that he had tried to keep the keys 'user friendly', and in this he has succeeded. For anybody, even those who have never looked at a centipede before, then identification is now possible.

Then comes a chapter on European Centipedes which might appear in Britain (10 species) which includes a tabular key to the 6 species of *Lithobius* which could easily be overlooked amongst our native species. There is then a page on Exotic species introduced to Britain with plants etc.

Finally there is a full Glossary followed by Acknowledgements, Bibliography, References and a clear Index of Scientific Names. The proofreading has been very thorough and the reviewer could not detect any errors in the text or in the printing.

This is a book that anybody interested in centipedes or soil animals must have and anybody with a general interest in wildlife should have.

Eric Philp

A NEW, HIGHLY SEXUALLY DIMORPHIC SPECIES OF *COSMOPHORUS* RATZEBURG (HYMENOPTERA: BRACONIDAE: EUPHORINAE) REARED FROM CORSICA

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ABSTRACT

Cosmophorus laricio sp. nov., reared from adults of the bark-beetle *Pityogenes bistridentatus* feeding in dead twigs of *Pinus nigra laricio* collected in Corsica, is described and illustrated. The unusual behaviour of the apterous male is discussed in relation to its morphology and the species' presumed mating strategy.

INTRODUCTION

The cosmopolitan braconid subfamily Euphorinae has been variously regarded as including (e.g. van Achterberg, 1984) or excluding (S. R. Shaw, 1985, 1988; M. R. Shaw & Huddleston, 1991; see also Pitz *et al*., 2007) the tribe Meteorini, which are koinobiont endoparasitoids of larval Coleoptera and Lepidoptera. Without Meteorini, Euphorinae all have the unusual life-style of parasitising adult or nymphal insects, different genera specialising, always as koinobiont endoparasitoids, on parts of the holometabolous orders Coleoptera, Hymenoptera and Neuroptera, and the hemimetabolous Hemiptera, Psocoptera and (in one non-European case) Orthoptera (S. R. Shaw, 1985, 1988; M. R. Shaw & Huddleston, 1991). A necessity for these parasitoids is that the host has a reasonably long adult life, and a sufficient nutrient throughput, to support the development of the parasitoid, which at least partly explains the host groups that have been colonised by Euphorinae. Many euphorine genera exhibit extreme morphological features associated with attacking adult insects, usually solitarily though in a few genera gregarious species are known. Among the most specialised of all (Čapek, 1970; S. R. Shaw, 1985) is the strictly solitary genus *Cosmophorus* Ratzeburg, with its large head and huge low-slung mandibles which the female parasitoid uses to grasp the body of its adult bark-beetle (Coleoptera: Curculionidae: Scolytinae) host head-to-head (illustrated by Seitner & Nötzl, 1925, then by Hedqvist, 1998 [reproduced by van Achterberg & Quicke, 2000]) while the ovipositor is inserted; an action that generally or perhaps invariably takes place while the bark-beetle is constrained in its tunnel and with the help of a temporarily paralysing venom (Seitner & Nötzl, 1925). As with all Euphorinae, the host continues to be active and feed while the parasitoid develops, and is only killed shortly before the parasitoid is ready to leave it to spin an external cocoon; in this case situated in the bark-beetle's tunnel (Fig. 1).

Cosmophorus is a small genus, species of which are not easily collected. However, economic interest in bark-beetles, especially those affecting conifers, has helped the European fauna to come to light, though all the species known are certainly greatly under-recorded. Five European species have been described, and were keyed by Čapek (1958) and Hedqvist (1998) and also included by van Achterberg & Quicke (2000), to which a sixth is added here. Only one has so far been discovered in Britain (M. R. Shaw, 1989). All are associated with conifers, but outside Europe association of the genus with non-conifers is known (Loan & Matthews, 1973).

Material and methods

The material from which the new species is described below resulted from the collection of a pillowcase-full of narrow (ca 0.3–1.0 cm diameter) twigs collected from a fallen mature example of the Corsican endemic tree *Pinus nigra* Arnold ssp. *laricio* Maire at 1000 m in the Forêt d'Aïtone, 3 km NE of Evisa, Corsica, on 19.vii.2001. The tree still had a profusion of brown needles attached, and it seemed likely to have fallen about 18 months previously. The twigs were transported to Scotland and left in the tied pillowcase which was kept indoors, as far as possible in an unheated room, and the prodigious numbers of adult Coleoptera and Hymenoptera that emerged and revealed themselves by resting on the insides of the pillowcase were removed during frequent inspections over the following year (usually daily except at the height of winter). No moisture was added, and after a year activity had more or less ceased. See also "Host and biology" below.

SEM images were taken on a CamScan MX 2500 (15 kV; spot size 2). Wing veins are named as in van Achterberg & Quicke (2000).

Cosmophorus laricio sp. nov. (Figs 1–10)

Female (Figs 2–5). Holotype: length (excluding ovipositor) 1.6 mm; of fore wing 1.5 mm. Head in dorsal view 1.3 times as wide as long (to front of eye, i.e. excluding antennal shelf), subrectangular, temple twice as long as eye and initially almost straight behind eye then roundly narrowing in posterior two fifths; occipital carina effaced medially; posterior margin of head only relatively weakly impressed and head without medial longitudinal depression; eyes in dorsal view 3.5 times as far apart as their width, in lateral view 1.1 times higher than wide and 0.6 times as wide as temple at mid-eye level (= distance to occipital carina); ocelli small and inconspicuous, posterior pair separated by about 3.5 times their diameters, distance between a posterior and anterior ocellus about 2.5 diameters; malar space extremely short, eye almost adjoining mandibular socket; mandible relatively weak and thin for genus; head essentially unsculptured apart from a ridge leading from antennal shelf towards anterior ocellus and some rugulosity on antennal shelf but with numerous short setae and longer setae around clypeal region; antenna with 12 segments, about 1.7 times as long as width of head, third segment the slenderest and with few setae, fourth longer, basally narrow, partly setose, twice as long as wide at its apex where it is produced below, fifth and subsequent segments more cylindrical, each about twice as long as wide, 0.7 times as long as fourth segment and evenly strongly pubescent. Mesosoma about as wide as head, 1.9 times as long as high; pronotum dorsally with some punctures; mesoscutum rising steeply; mesoscutum and scutellum smooth but with short setae, those on mesoscutum rather evenly distributed at sides but becoming sparser and eventually absent centrally; scutellar sulcus shallow, crenulae almost effaced medially; propodeum largely smooth, only posteriorly and towards the more rugulose metapleuron with a few weak rugulae; mesopleuron with weak and scattered small punctures, otherwise side of mesosoma mostly smooth; hind leg with coxa smooth, femur 2.7 times as long as wide, tibia 1.5 times as long as femur and about 8 times as long as wide, tarsus about 0.8 times as long as tibia with basitarsus 0.75 as long as the remaining segments together and the fourth segment hardly longer than wide; fore wing with r practically absent so that 2-SR and 3-SR both separately arise direct from the pterostigma, 2-SR + m-cu about as long as 3-SR + SR1 (measured to wing margin where spectral), 1-CU1:2-CU1 ca 1:6. Metasoma two thirds as wide as head; first tergite gradually widening to apex where it is 0.8 times as wide

Figures 1–10. *Cosmophorus laricio* sp. nov. [NB: some of the SEM images give deceptive impressions of dimensions, as out-of-plane parts remain in good focus]. 1, emerged cocoon in situ, with host remains. 2–5, female. 2, habitus, dorsal view. 3,4 head. 3, approximately dorsal view. 4, facial view. 5, propodeum and first metasomal tergite, to show sculpture. 6–10, male. 6, whole insect, in life. 7, 8 habitus. 7, dorsal view. 8, lateral view (flagellum removed). 9, part of face, to show malar space. 10, propodeum and first metasomal tergite, to show sculpture.

as its length, almost unsculptured (similar to propodeum); subsequent tergites smooth but each with a single row of setae near apex; second tergite 0.5 times as long as first, 2.3 times wider than long and about 0.7 as long as third but scarcely differentiated from it; ovipositor sheath flattened, straight, parallel-sided, 1.2 times as long as hind tibia and 0.4 times as long as fore wing. Colour: pitchy brown, the tibiae, tarsi, basal antennal segments and mouthparts all more or less yellowish brown; wing hyaline with venation brown and pterostigma dark brown.

Male (Figs 6–10). Wingless. Size comparable with female; length ca 1.5–1.6 mm. Head less transverse, 1.2 times as wide as long; eye smaller, temple 2.8 times as long as eye, eyes in dorsal view 5 times as far apart as width of eye, in lateral view 0.5 as wide as temple at mid-eye level, malar space longer so that eye clearly well removed from margin of mandibular socket; antenna with 11 or 12 segments, about 2.3 times as long as width of head, fourth segment less flared than in female and 2.5 times as long as its width at apex, fifth and subsequent segments over 3 times as long as wide. Mesosoma smaller, 0.8 times as wide as head, 1.6 times as long as high; scutellar sulcus almost without crenulae; propodeum with more substantial longitudinal sculpture than in female; mesopleuron with an impressed groove (? may not be precoxal sulcus); hind femur ca 2.4 times as long as wide (more robust than in female); tegulae developed but wings practically absent (visible only as stumps about as long as tegula). Metasoma slender in death, about 0.7 as wide as head; 1st tergite 1.1 times as wide as long and rather densely longitudinally sculptured; second tergite 0.9 times as long as first and about 1.6 times as wide as long, and longer than third tergite. Colour as female.

Variation. There is practically no size variation. Some females (especially those that emerged in iv.2002, representing the overwinter generation: see below) have some slight development of weakly longitudinal but mostly granular sculpture towards the base of the first tergite and/or on the propodeum more generally; the first tergite is also sometimes more robust (0.9 times as wide as long). In some females the ocelli appear to be in an equilateral triangle, but in others the triangle appears flatter. In some females the radius stops abruptly some distance from the fore wing margin and is not traceable to it, but in others its continuation to the margin, although spectral, is clear. The number of antennal segments varies between 11 (9 examples) and 12 (20 examples) in males, but appears to be much more constant at 12 (27 examples) in females.

Material examined. Holotype ♀: "CORSICA: Forêt d'Aïtone, Evisa. 1000 m. Twigs d[ea]d Pinus nigra laricio 19.7.2001 with + + + Pityogenes bistridentatus, + + Pityophthorus buyssoni, few Crypturgus cinereus (also Cryptolestes) em[erged] 8.01 M. R. Shaw" (In National Museums of Scotland, Edinburgh (NMS)). Paratypes: 6 ♀, 4 ♂, same data as holotype; 10 ♀, 12 ♂, same data except em[ergence] as follows: 2001 (1 ♀, 2 ♂), iv.02 (8 ♀, 8 ♂), 15.v.02 (1 ♂), 3.vi.02 (1 ♀) and 3.viii. 02 (1 ♂); 6 ♀, 11 ♂ same locality and substrate data, "with Pityogenes bistridentatus (etc) continued breeding in capt . . . M. R. Shaw" and emergence dates as follows: 17.v.2002 (1 ♀, 2 ♂), 19.v.2002 (1 ♀, 1 ♂), 21.v.2002 (1 ♂), 22.v.2002 (1 ♂), 24.v.2002 (2 ♀, 2 ♂), 25.5.2002 (1 ♂), 26.v.2002 (1 ♂), 29.v.2002 (1 ♂), 3.vi.2002 (1 ♀, 1 ♂) and 9.vii.2002 (1 ♀); 1 ♂ "Cultured (CORSICA: Evisa, F. d'Aitone from Pinus nigra laricio scolytids). Pityogenes bistridentatus ovip. iv/v.02. Pinus sylvestris, em vi.02 M.R.Shaw". Also 2 ♀, 1 ♂ with data comparable with that of holotype, preserved in alcohol. All the foregoing deposited in NMS except 1 ♀, 1 ♂ in each of BMNH, London and RMNH, Leiden.

Etymology. Named after the distinctive Corsican endemic subspecies *laricio* Maire of *Pinus nigra* Arnold whose forests are included in the 1992 EU Habitats Directive

(annex 1) because of their rich associated animal and plant communities (see also Norstedt, Bader & Ericson, 2001).

The new species can be separated from all other species found in Europe by its smaller number of antennal segments, greatly reduced sculpture of the propodeum and first tergite in the female and relatively less robust mandibles, as well as the virtually complete absence of wings in the male. Two other European species, *C. henscheli* Ruschka and *C. roubali* Čapek, have brachypterous males but in the first the wings are substantially developed, and even in *C. roubali* they extend almost to the propodeum (Čapek, 1958). Both of these species have 13–14 segmented antennae. It is of interest that all three of the European species now known with reduced or absent wings in the male sex are sexually dimorphic also in the wider shape of the first metasomal tergite and the greater extent of sculpturation of both that and the propodeum in the male (see below).

Host and biology

Many species of beetles emerged in the pillowcase, including three species of Scolytinae: very numerous *Pityogenes bistridentatus* (Eichoff), a much smaller but moderate number of *Pityphthorus buyssoni* Reitter, and a few only of *Crypturgus cinereus* (Herbst). As the parasitoids were so uniform in size, it seemed likely that they were all from the same species of host and because of its greatest abundance it seemed likely that this would be *P. bistridentatus*. To test at least whether this beetle could possibly serve as host, some adults were placed in a corked 5×2.5 cm glass tube with freshly dead 3–4 mm diameter twigs of *Pinus sylvestris* (collected in Edinburgh) at the end of iv.2002 and, when the beetles had duly entered the bark, a female parasitoid and a smear of diluted honey were added to the tube. After a few hours the *Cosmophorus* adult had disappeared from view [it was much later seen dead in the tube], and in vi.2002 a male *Cosmophorus* emerged; when bark was subsequently removed from the twigs a dead *P. bistridentatus* was found in its feeding chamber with an emerged cocoon of the parasitoid beside it (Fig. 1). Whether or not the beetle was already parasitized when it was confined, which is perfectly possible, this demonstrated that *P. bistridentatus* can be a host, but not, of course, that all of the *C. laricio* sp. nov. that were reared had developed in that species. However, the male resulting from this experiment is the same size as all the rest, and the indications are that this beetle species was the natural host for most, and perhaps all, of the type series. It was also clear that overall many of the reared *C. laricio* sp. nov. must have resulted from ovipositions that had taken place in the pillowcase, probably including all adults that emerged in 2002.

Species with fully winged females but apterous or brachypterous males are known in various Chalcidoidea (e.g the eulophid *Melittobia acasta* (Walker), the pteromalid *Nasonia vitripennis* (Walker) and many agaonids) but in these cases it is usually associated with gregariousness and mother-son or sib- mating within a confined space. Wing reduction or loss, particularly in females, occurs sporadically in several groups of cyclostome Braconidae in the Palaearctic region, but among the non-cyclostome lineages (in which Euphorinae is placed) it is very uncommonly noted; perhaps only in *Cosmophorus* affecting the male sex differentially, and even then not as extremely manifest as seen in *Cosmophorus laricio* sp. nov. (cf. Belokobilskij, 2009).

In life, the apterous males of *C. laricio* sp. nov. (Fig. 6) displayed the curious behaviour, observed on many occasions, of raising the metasoma through about 60° or more and remaining stationary for long periods in an exposed position,

presumably emitting pheromones from or near the apex of the metasoma (frustratingly, no photograph could be obtained of this posture because the slightest disturbance caused them to rapidly lower the metasoma and move on, but a similar stance is figured for the brachypterous male of *C. henscheli* by Seitner & Nötzl, 1925). This behaviour must surely be associated with the flightlessness of the male, and the presumed need for the female sex to do the mate-searching. The smaller eyes of the male also suggests that it is not looking for as much as is the female, and its more strongly sculptured and robust first metasomal tergite might engage usefully with its similarly sculptured propodeum to support the metasoma in its raised position. The other European *Cosmophorus* species with flightless males seem to exhibit similar sexual dimorphisms (cf. Čapek, 1958). As long-range male sex pheromones are a rarity in Hymenoptera (but see Ruther *et al.*, 2007) further investigation would be of great interest, including field observation to ascertain whether the males, despite being wingless, attempt to aggregate to form leks, as is known to occur in some Diptera in which the males emit sex pheromones (cf. Preston-Mafham & Preston-Mafham, 1993).

Acknowledgements

I am grateful to Jacek Hilszczanski and Tomek Mokrzycki for identifying the beetles, to Diane Mitchell, Bill Crichton and Daniella Watson for taking or manipulating images, and to my wife Francesca who helped to collect the twigs and endured the embarrassment of our hand luggage on the flight home. Kees van Achterberg kindly gave helpful comments on a draft of the manuscript.

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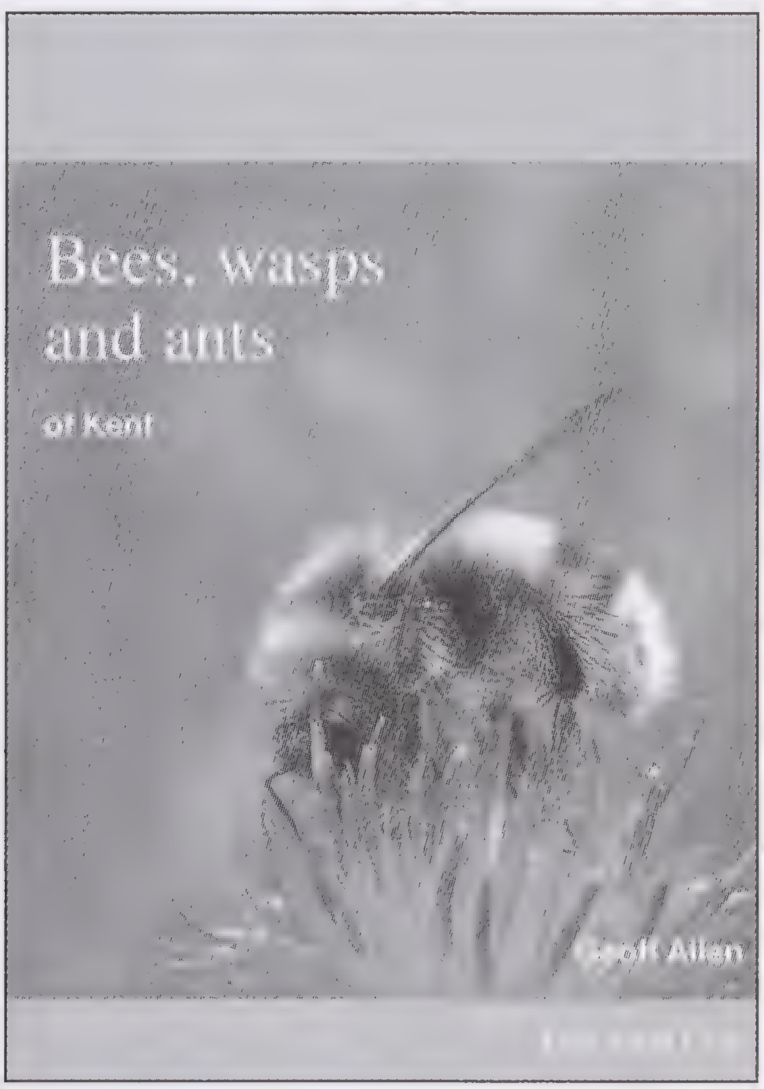
BOOK REVIEW



***Bees, wasps and ants of Kent, a provisional atlas* by Geoff W. Allen.** 124pp. Designed and published by The Kent Field Club. ISBN 978-0-9561926-0-8. £22.50 including p&p, available from Mr R. Moyse, 2 West End Cottages, Doddington, Kent ME9 0BZ.

This is the first book in a brand new series produced by the Kent Field Club describing the distribution and status of the fauna and flora of Kent. Atlases at the compilation stage include ones on plants, dragonflies and seaweeds of the county all produced in a common, easy to read format, illustrated with coloured maps and photographs of key species. The year ahead will therefore be an expensive one for the Field Club assuming all the books are published on time.

There are 440 distribution maps and 7 composite maps for the 448 species of aculeate Hymenoptera recorded from Kent plotted from a database of approximately 55,000 records. All families are covered apart from the Dryinidae, Embolemidae and Bethylidae (an additional 22 species) for which a brief résumé is given. The book developed as a result of the author acting as the county referee for this group of insects and compiling the first proper electronic database for Kent's aculeate Hymenoptera. All these records have now been transferred to the newly-created Kent & Medway Biological Records Centre, Faversham, which in its first three years of existence now holds more than 2 million taxa records.

The introductory chapter describes the classification of the Hymenoptera and includes brief accounts of their nesting, foraging and parasitic behaviour in relation to Kentish species. The main part of the text (87pp) is devoted to individual species accounts with maps, where appropriate. Recording is divided into four date classes, pre-1910, 1910–1949, 1950–1984 and 1985–2007, using a combination of coloured

dots and a + symbol for pre-1910. Black dots, which stand out most, have conveniently been used for the most recent period when most of the recording was undertaken. There are up to six maps per page, each measuring 8×5 cm, just about the right minimum size for readers to easily comprehend the distribution of species in a county the size of Kent (c. 4000 sq. km) Luckily the underlying geology and associated plant communities are relatively easy to delineate and these are displayed on each map as seven mainly east-west bands across the county. The darker colours used for the dots means that they stand out very clearly on the map even when positioned against the same colour background.

The frequency of occurrence of each species is given below the maps in numerical form: the number of post 1985 tetrad dots (equating to present distribution), the total number of tetrad dots (pre-1910–2007), the observed period of adult activity (apparently no-one seems to study any other part of the life cycle) and national and local statuses.

Coverage is pretty good (80%) with records from 898 of the 1121 tetrads representing vice-counties 15 and 16 (East and West Kent, respectively). The author rightly advises caution when interpreting the apparent changes in distribution of certain species that span several date classes indicating these might equally be due to recorder effects. John Felton and Gerald Dicker were highly active recorders over slightly different periods during 1950s–1980s with different specialisms and the maps reflect the intensity of their recording. Ideally each recording area should be surveyed a similar number of times, but with a small band of active recorders this is not possible in Kent at the present time.

Nevertheless changes in distribution are apparent – until about a decade ago there were more specimens of hornet in the county collection at Maidstone (<5) all dating from >50 years ago than from the field, whereas today the wasp appears to be spreading eastwards across the county in a true wave of expansion. If there hadn't been the odd specimens in the museum for verification, one might have concluded the hornet was an entirely new species to the county. So, collections remain important even in the digital age. Species distributions can change extremely rapidly, for example the tricolored bumblebee *Bombus hypnorum*, a recent colonist in the UK, is recorded from two isolated squares in the atlas but has appeared at numerous sites across the county this year. Kent can also expect the re-introduction of an extinct bumblebee *Bombus subterraneus* in a few years time.

The author is a gifted artist. Numerous illustrations of bees and wasps drawn by the author especially for the book are included and these are all of a very high standard. These together with a scattering of colour photographs add strength to the species accounts. References have been kept to a minimum for reasons of space, which I fell is a pity, as publication of the book would have provided an ideal place to bring together all the literature relating to aculeates in Kent.

The book ends with a number of appendices listing aculeate species possibly but not conclusively recorded from the county, species that might yet be recorded particularly those expanding their range due to climate change and doubtful species. There is also a page devoted to explaining the base map showing the land divided into a series of Natural Areas, each with a characteristic association of geology, wildlife and landform. On reflection, this map should have been placed at the front of the book for easier reference and not hidden away in the appendices.

This is the eighth atlas published by the Kent Field Club and the author is to be congratulated on bringing together all the basic information on the county's aculeate Hymenoptera in such an attractive book.

JOHN BADMIN

2008 ANNUAL EXHIBITION

Imperial College, London SW7 – 8 November 2008

The following accounts of the exhibits were compiled by A. M. Jones (British Butterflies), S. P. Clancy (British Macrolepidoptera), R. J. Dickson (British Microlepidoptera), N. M. Hall (Foreign Lepidoptera), P. J. Chandler (Diptera), R. G. Booth (Coleoptera), A. J. A. Stewart (Hemiptera), M. N. Smith (Hymenoptera and other Orders) and J. S. Badmin (General). In the past, the choice of insects for photography has largely been dictated by size, despite the primary aim of producing exhibition plates showing new and unusual species from all Orders. Most of the insects finally selected have tended to be Lepidoptera. This year, a much more representative range of species, including some very small flies, bugs and beetles have been included for the first time. An appreciable number have never been photographed before so the plates should prove extremely useful for identification purposes. This has been possible through the expertise of our official photographer, Joseph Botting, using the latest advances in digital camera technology. The cost of printing the plates was covered by a grant from the Hammond Memorial Fund.

Approximately forty members and their guests attended the Society's Annual Dinner which took place in the Senior Common Room at Imperial College immediately following the exhibition. Members were able to relax and chat over a drink or two at the bar beforehand. The sit-down meal was satisfactory and the university's catering staff deserve our thanks for a memorable evening. This is one of the very few occasions when members of the Society can socialise and make new acquaintances and it is hoped that more members will make the attempt to attend in future. Mike Simmons, Exhibition Secretary, deserves our special thanks for ensuring that the whole day ran extremely smoothly without any apparent technical hitches.

BUTTERFLIES

BAILEY, K. E. J. – Results of breeding experiments during 2008. *Anthocharis cardamines* (L.) males with dark costal and tornal areas, bred from wild ova. *Colias alfacariensis* (Ribbe), a bred pair from larvae that overwintered under natural conditions in central England from stock originating in S.W. France in September 2007 and F_2 females from the same stock with reduced dark markings from heat shocked pupae. *Lycaena dispar batavus* (Oberthür) a bred female with "*radiata*" type forewings, cause unknown.

Apatura iris (L.) a female ab. *iolata* Cabeau from heat shocked pupa and an ab. *iredella* Cabeau (undersized), from inbred stock. *Euphydryas aurinia* (Rott.) a female underside with colours greatly diluted, the upperside approaching ab. *bicolor* Wehrti, also specimens approaching ab. *sebaldus* Schultz from cold-shocked pupae and the last examples of ab. *atratus* Bailey from stock that the exhibitor has been maintaining for some years, that has now failed. *Boloria selene* (D. & S.) aberrations resulting from cold and then heat shock. *Melitaea parthenoides* (Keferstein) a specimen resembling a *Melitaea athalia* (Rott.) aberration, the only example resulting from many temperature shock regimes tried on this European species. Also an underside specimen of an aberration similar to ab. *tetramelena* Cabeau of *M. athalia*, that occurred spontaneously among the stock. This had a portion of the left forewing (underside) missing that may have been caused from a bite from a sibling larva to the freshly formed pupa. The exhibitor believes this injury may have caused the aberration as it is said that during the healing process a juvenile hormone

like substance is released possibly inhibiting differentiation in the wing pattern. This substance may be released during temperature shocks thus triggering the well-known aberrations in various species. This theory could be applied to some of the regularly occurring obsolete aberrations found in *Polyommatus coridon* (Poda) and *P. bellargus* (Rott.), the pupae possibly being nibbled by ants and the resultant aberrant imagines having pock marked or deformed wings. A series of specimens of *M. parthenoides* with homoeosis to the forewing and hindwing undersides similar to examples that used to regularly occur in some of the Kentish populations of *M. athalia*. Pairings between similar siblings gave stock with poor fitness but 85% were homoeotic suggesting that in this species homoeosis is genetically dominant. All the *parthenoides* stock originated from S.W. France September 2007.

Argynnis paphia (L.) f. *valesina* Esper, an ab. *post-confluens* Spuler that is the most usual form of pattern change and an example of the less common ab. *ante-confluens* Spuler. Also extreme specimens of both typical and f. *valesina* being heavily melanic (Plate 1, Fig. 2). All from cold shocked pupae. A f. *valesina* ab. *confluens* (Plate 1, Fig. 1) showing what appeared to be only partial *valesina* expression having a ground colour more yellowish than usual. This was bred from *A. paphia* of Corfu origin where *valesina* is unknown, paired with British *valesina*.

Aglais urticae (L.) colour forms from pupae given late heat shock during the period of scale formation (Plate 1, Fig. 7) and an extreme ab. *conjuncta* Neuberg from heat shock. *Argynnis aglaja* (L.), a minor suffused form resulting from several cold/heat shocks. Examples of *Issoria lathonia* (L.) bred from stock originating in SW France, with melanic centres to the forewings. These were given a series of cold shocks followed by a heat shock. Also a similarly treated specimen with the entire forewings suffused with black scaling.

Jones, A. M. – *Pieris rapae* (L.), a pair with dark suffused undersides. These were bred in an F_2 generation in March 2008 from a typical parent taken at Kingston Upon Thames, Surrey in 2007. Pairings from less suffused examples were obtained but all the offspring were typical suggesting it is not heritable. The female is extreme (Plate 1, Fig. 6), it emerged 15.iii.2008.

Lycaena phlaeas (L.), a male ab. *remota* Tutt, 30.viii.2008 and a female approaching ab. *antiradiata* Derenne (Plate 1, Fig. 5), 21.ix.2008. This species had a remarkably good autumn in Surrey and the exhibitor found them common at many sites, several aberrations were noted of which the exhibited pair was the most significant.

Parker, R. – An exhibit entitled “Documenting a Translocation”, based around the exhibitor’s 2008 Presidential Address Part 2, which explained the ins and outs of arranging a re-establishment attempt with special reference to the translocation of *Plebejus argus* (L.) to Blaxhall Common, Suffolk in 2007. The exhibit comprised the BJENHS article, the special edition of the “Suffolk Argus” that included the Record of Insect Establishment on a JCCBI proforma (page 4) and Report on the 2007 translocation. Also photographs and details of the text pinned to the notice board erected at the translocation site.

Rook, S. J. – Two individuals of *Polyommatus coridon* (Poda) with atypical undersides taken in Dorset: a female ab. *caeca* Courvoisier, August 1991 and the male ab. *discoelogata* B. & L. (Plate 1, Fig. 4), taken 23.vii.2008.

Tremewan, W. G. – Butterflies taken in Cornwall in 2008: a short series of *Pararge aegeria* (L.) showing variation in spot pattern on the upperside of the wings; two *Pyronia tithonus* (L.) with two extra ocelli on the forewing underside; a very dark female of this species with unusually broad borders on both the forewings and hindwings; a male *Maniola jurtina* (L.) with a pronounced but very pale, almost

yellow, discal spot on the forewing upperside; a female of the same species with pronounced orange markings on the forewing and hindwing uppersides, a form that is characteristic of many individuals in Cornwall.

British Macrolepidoptera

Bland, K. P. – *Zygaena lonicerae latomarginata* Tutt from Craigburn, near Leadburn, Peebleshire, on 19.vii.2008. At least 15 mating pairs and a similar number of single adults were recorded on this date, the first records from VC78.

Butcher, A. G. J. – A specimen of *Elaphria agrotina* (Guen.), the first British record of this New World species occurring principally in central and South America (Plate 2, Fig. 4). It was taken at light at Grain, Kent on 1.vii.2008 in the exhibitor's garden and considered most likely to have been accidentally imported. Also exhibited was an example of *Catocala fraxini* (L.) taken at Niton on the Isle of Wight on 24.ix.2008.

Clancy, S. P. – An exhibit that included the following species, recorded in the Dungeness area, E. Kent during 2008: *Drepana curvatula* (Borkh.), Dungeness, 26.vii.; *Eupithecia abietaria* (Goeze), first area record from Dungeness, 2.vi.; *Itame brunneata* (Thunb.), the first area records from Greatstone, 8.vi. and Dungeness, 11.vi.; *Acronicta auricoma* (D.& S.) from New Romney, 14.vii.; *Ctenoplusia limbirena* (Guen.), first area record from Lydd, 19.vi.; *Catocala electa* (View.), one found by day at Dungeness, 21.viii. Also shown was an example of *Minucia lunaris* (D.& S.) taken at Kingsdown, E. Kent, by N. Jarman on 3.vi.2008. Aberrants shown included an unusually marked *Idaea biselata* (Hufn.) from Kingsdown, Kent on 17.vii.2008, and a heavily suffused specimen of *Mamestra brassicae* (L.) from Greatstone on 21.vi.2008 (Plate 2, Fig. 6).

Clarke, J. H. – From Beauley, near Inverness, viii.2008, examples of *Eupithecia abietaria* (Goeze) and *Eugnorisma depuncta* (L.); from Co. Kerry, vi.2008, examples of *Camptogramma bilineata hibernica* Tutt, *Acronicta rumicis* (L.) ab. *salicis* Curt., and a pale form of *Stauropus fagi* (L.). Also shown were *Drymonia ruficornis* (Hufn.) ab. *grisea* Turati from Crawley Down, W. Sussex, v.2008; *Chilodes maritimus* (L.) ab. *wismariensis* Schmidt from Icklesham, E. Sussex, v.2008; *Heliophobus reticulata hibernica* Cock., bred ex. female, Mizen Head, Co. Cork, vi.2007; and *Cyclophora ruficiliaria* (H.-S.), examples bred from a female taken near Falmouth, Cornwall, viii.2008 (Plate 2, Fig.3).

Cook, R. R. – A selection of moths taken or reared from a number of widely spread localities, these including: *Epirrhoe rivata* (Hb.), bred from a female taken at Puddletown, Dorset on 7.vii.2007; *Eupithecia venosata fumosae* Gregs. bred from larvae collected in Urafirth, Shetland in vii.2006; *Acronicta euphorbiae myricae* (Guen.), bred specimens from Scotland and Ireland to exhibit the geographical differences; *Schrankia taenialis* (Hb.), bred from a female taken at Blean Woods, E. Kent on 15.vii.2008, reared on lettuce, runner beans and umbellifer heads; and *Paracolax tristalis* (Fabr.) taken at Blean Woods, E. Kent on 15.vii.2008.

Deans, M. – Moths taken in East Suffolk in 2008 that included the following: *Pelosia muscerda* (Hufn.), a migrant specimen from Dunwich Heath on 25.vii. (captor: C. Moore); *Eilema pygmaeola* (Doubl.), a probable migrant specimen from Bawdsey, 25.vii.; *Agrotis segetum* (D.& S.), a unique and striking aberration from Bawdsey, 27.vii. (Plate 2, Fig. 8); *Actinotia polyodon* (Clerck.), an example taken at Westleton, 30.v. (captor: M. Hales); *Proxenus hospes* (Frey.), Bawdsey, 19.viii. (a second example recorded at this site on 27.viii.2008); *Chrysodeixis chalcites* (Esp.),

Bawdsey, 13.ix. (one of four site records during the month); and *Macdunnoughia confusa* (Steph.), the second site record from Bawdsey on 12.ix.

DOBSON, A. H. – A selection of species recorded during a 2008 survey of the Winnall Moors North Reserve, Winchester, N. Hants. These included examples of *Orthonama vittata* (Borkh.), *Xanthorhoe biriviata* (Borkh.), *Eupithecia valerianata* (Hb.), *Anticollix sparsata* (Treit.), *Mythimna obsoleta* (Hb.), *Celaena haworthii* (Curt.), *Deltote uncula* (Cl.), and *Hypena rostralis* (L.).

GILL, N. – Some moths taken or reared during 2007 and 2008 including *Eugnorisma depuncta* (L.) from N. Yorks., viii.2007; *Eugnorisma glareosa* (Esp.) f. *edda* Stdgr. and *Xanthorhoe decoloraria heathlandica* Prout from Shetland, viii.2008; and *Eupithecia intricata hibernica* Mere, *Eupithecia venosata plumbea* Huggins, *Setina irrorella* (L.) and *Hadena caesia* (D. & S.) from the Burren, Co. Clare, Ireland.

HALL, N. M. – An exhibit showing the f. *carbonaria*, f. *insularia* and typical forms of *Biston betularia* (L.), all having occurred in a single brood resulting from a pairing between a typical female and male f. *carbonaria*. Exhibition notes discussed the possible genetics necessary to produce the range of forms exhibited.

HAMMOND, M. – An exhibit by the county recorder showing four significant VC32 records from 2008: *Catarhoe rubidata* (D. & S.), an example taken at Woodnewton on 1.vii., where a second record occurred on 16.vii. (captor: N. Smith), only one previous modern VC record; *Euphyia biangulata* (Haw.), the first VC record in almost 70 years from Greatworth on 27.vii. (captor: T. Stokes); *Meganola albula* (D. & S.), the first VC record from Woodnewton on 26.viii. (captor: N. Smith); and *Eumichtis lichenea* (Hb.), the third VC record from Oundle on 25.ix. (captor: P. Horsnail).

HARMAN, T. – Short series of *Biston strataria* (Hufn.) and *Ennomos quercinaria* (Hufn.) from Turville Heath, Buckinghamshire to show the range of variation at this site. Examples of the latter species were particularly unusual with examples of a form unknown to a number of experienced lepidopterists at the exhibition (Plate 2, Fig. 7). Also shown was a specimen of *Hecatera dysodea* (D. & S.) reared from a larva found at High Wycombe, Bucks.; an aberration of *Campaea margaritata* (L.) from Turville Heath, Bucks., and an aberration of *Thyatira batis* (L.) taken by M. G. Allen at Dane Hill, Sussex in 1955 and recently found in an old collection.

HAYWARD, R. – An exhibit mainly consisting of species recorded from Wokingham, Berkshire during 2008, the most interesting of which were examples of *Rhodometra sacraria* (L.) on 30.vii.; *Euchoeca nebulata* (Scop.) on 27.v.; *Eilema caniola* (Hb.) on 4.vii. (a total of eight records in 2008 between 4.vii. & 12.x.); *Odontosia carmelita* (Esp.) on 27.iv.; and *Xestia glareosa* (Esp.) on 6.ix.

A number of minor aberrations were also shown that included the striking ab. *subroseata* form of *Cyclophora albipunctata* (Hufn.). Among a number of unseasonable records detailed was a record of *Erannis defoliaria* (Cl.) taken on 8.ix., following the specimen from the same site on 5.ix.2007 exhibited at last year's exhibition.

Several specimens were also shown by this exhibitor from Meopham, W. Kent, that included *Thera cupressata* (Geyer) on 20.vi.; *Eupithecia phoeniceata* (Ramb.) on 23.ix. (one of two recorded); *Hecatera dysodea* (D. & S.) on 27.ix.; and *Polymixis lichenea* (Hb.) on 20.ix. (one of two recorded). Also shown were three specimens of *Mimas tiliae* (L.) bred ex. ova (laid in trap at this site) on *Salix* spp., mainly 'Weeping Willow'.

HENWOOD, B. P. – *Eupithecia virgaureata* (Doubl.) swept as larvae from heather-dominated heathland in S. Devon on 9.ix.2007 and reared on *Calluna vulgaris*. Also

Schrankia costaestrigalis (Steph.) bred from a female taken at Inverinate, West Ross and reared on lettuce.

JENKINS, A. – A variable series of third generation *Arctia caja* (L.) bred from a female taken at Wicken Fen, Cambs. Selective pairing had produced some unusual forms, two of the most extreme specimens being selected for photography (Plate 1, Fig. 3).

KNILL-JONES, S. A. – A selection of species recorded at Totland, Isle of Wight during 2008 that included a deeply coloured and strongly marked example of *Cyclophora puppillaria* (Hb.) that may have been locally bred, taken on 6.v. (Plate 2, Fig. 12); *Ennomos autumnaria* (Werneb.), the second Island record on 30.viii.; *Leucoma salicis* (L.), a probable immigrant example on 23.vii.; *Lithosia quadra* (L.), an immigrant taken on 25.vii.; *Coenobia rufa* (Haw.), a strongly marked specimen, 1.viii.; and *Proxenus hospes* (Frey.), a specimen taken on 13.ix. Also shown were examples of *Catocala fraxini* (L.) bred from the female taken at Totland on 6.x.2007 and shown at last year's exhibition, including preserved examples of the larval and pupal stages.

LANGMAID, J. R. – Two interesting aberrations taken at Southsea, Hants. in 2008: *Camptogramma bilineata* (L.) ab. *infuscata* Gump., 27.viii; *Hoplodrina ambigua* (D. & S.), a strongly marked specimen, 30.v.

MASTERS, I. D. – From Owlsmoor, Sandhurst, Berkshire, further examples of *Eilema caniola* (Hb.) of which there were four records in 2008 (the third successive year this species has occurred at the site), and the first site record of *Macaria notata* (L.). From Middleton-on-sea, W. Sussex, in 2008, examples of *Orthonama vittata* (Borkh.) on 25.vii., *Pelosia muscerda* (Hufn.) on 25.vii., *Lithosia quadra* (L.) on 11.x., and *Cryphia algae* (Fabr.) on 25.vii., the first three mentioned species being new site records.

MCCORMICK, R. F. – Species of interest recorded in Devon during 2008 by a number of recorders, although the specimens shown were not necessarily those recorded during the 2008 season. Species exhibited included the following: *Idaea degeneraria* (Hb.), a species that turns up annually in the county, with a comment that the two fresh specimens that occurred at Holcombe on 9 & 23.v.2008 suggested local residency; *Rhodometra sacraria* (L.), apparently the only county record in 2008, taken by A. Trout at Shaugh Prior on 2.v.; *Hyles livornica* (Esp.), records from Hennock on 7.v.2008 (captor: B. Bewsher) and Budleigh Salterton on 11.v.2008; *Thaumetopoea processionea* (L.), the second county record taken by S. Stripp at Heavitree, Exeter on 10.viii.2008; *Macdunnoughia confusa* (Steph.), details of four records from the county in 2008, the fourteenth to seventeenth Devon records.

Also shown were minor aberrations of *Ochropleura plecta* (L.) and *Lacanobia oleracea* (L.), and a worn but striking form of *Spilosoma lubricipeda* (L.) exhibiting strong dark terminal suffusions (Plate 2, Fig. 9).

OWEN, J. – Moths from the exhibitor's garden near Dymchurch, East Kent, recorded new to the site in 2008: *Aethalura punctulata* (D. & S.) recorded on 9.v., *Itame brunneata* (Thunb.) recorded on 7.vii., *Lymantria dispar* (L.) recorded on 18.viii., and *Hypenodes humidalis* Doubl. recorded on 3.viii. These bring the total number of macrolepidoptera recorded from this long-standing recording site to 509 species.

PAGE, A. – A selection of species recorded by the exhibitor on recording field trips during the 2008 season. These included examples of *Lasiocampa trifolii* (D. & S.), *Eilema pygmaeola* (Doubl.) & *Earias clorana* (L.) from Dungeness, Kent on 24.vii.; *Paracolax tristalis* (Fabr.) taken at Blean Woods, E. Kent on 17.vii.; *Lycia zonaria*

(D. & S.) found by day on the Lancashire coast on 5.iv.; and *Sedina buettneri* (Hering) from an undisclosed Dorset site on 27.ix.

PARSONS, M. S. – An example of *Cyclophora ruficiliaria* (H.-S.) taken at light at Walditch, Dorset on 3.viii.2008.

PHILLIPS, J. W. – Some moths taken in the exhibitor's garden in Northney, Hayling Island, Hants. that included examples of *Noctua janthina* (D. & S.) on 27.vii.2008, *Cryphia algae* (Fabr.) on 18.vii.2008, and *Polychrysia moneta* (Fabr.) on 6.ix.2007. Also shown were examples bred from larvae of *Hemaris tityus* (L.) from Salisbury Plain, Wilts., and *Noctua orbona* (Hufn.) from Tunstall Common, Suffolk.

PLANT, C. W. – An example of *Deltote bankiana* (Fabr.) from West Thurrock, S. Essex on 5.vi.2008 with a comment that this species may be resident in the area. Also shown was a specimen of *Eilema caniola* (Hb.) taken by R. Ellis at Chorleywood, Bucks., on 19.viii.2008; the first county record of this species which has been establishing resident populations throughout south-east England in recent years.

Also exhibited were aberrations of four species, the most interesting of these of a *Xanthorhoe* spp. (captor: G. Lightfoot) that prompted some discussion on its identification but was eventually dissected and confirmed as *Xanthorhoe designata* (Hufn.) by the exhibitor following the exhibition (Plate 2, Fig. 5).

REID, J. – An exhibit detailing the occurrence of a new resident species of clearwing, *Pennisetia hylaeiformis* (Lesp.), from the exhibitor's garden at Meldreth, Cambs. and from two undisclosed localities within commercial fruit farms. Three of the four specimens shown were recorded at pheromone lures in 2008, the fourth specimen having been reared from a raspberry cane found in the exhibitor's garden in October 2007 showing feeding damage (Plate 2, Fig. 10). Photographs were also included showing the live adult moth at rest on the foodplant and a foodplant stump showing damage caused by the species. Also exhibited was a cut section of foodplant showing the larval mine, gall and an exuviae *in situ*.

ROUSE, T. – Examples of three migrant species recorded at Folkestone in 2008: *Chiasmia aestimaria* (Hb.), the fourth British record, 10.ix.; *Lithosia quadra* (L.), two specimens taken 25.vii. & 16.ix., the latter specimen having crippled forewings indicating it was unlikely to be a primary migrant; and *Proxenus hospes* (Frey.), three of five specimens taken on 10.ix.

SHERMAN, N. – A small selection of species recorded in Suffolk that included examples of *Cyclophora puppillaria* (Hb.), the second county record from Ipswich (VC25) on 24.v.2007; *Blepharita adusta* (Esp.) from near Lackford (VC26) on 30.v.2008; and *Cryphia algae* (Fabr.) from Ipswich (VC25) on 5.viii.2007.

TUNMORE, M. – A specimen of *Galgula partita* (Guen.) recorded from Marazion, Cornwall, on the night of 6. or 7.x.2008 and exhibited on behalf of its captor, D. Walbridge. The first record of this species at large in Britain (Plate 2, Fig. 1).

Also shown were examples of two rare immigrant species recorded by the exhibitor on the Lizard, Cornwall: *Ctenoplusia limbirena* (Guen.) taken on 5.ix.2008, and *Tathorhynchus exsiccata* (Led.) taken on 29.i.2008 (coinciding with a record arrival of the pyralid *Euchromius ocellea* (Haw.)).

WARING, P. – An illustrated exhibit detailing the re-discovery of *Leucodonta bicoloria* (D. & S.) in Co. Kerry, Ireland, in June 2008. A total of seven male examples were recorded at light over the two nights of 7 & 8.vi. at an undisclosed locality.

WHEELER, K. – Six examples of *Charanyca trigrammica* (Hufn.) from Fareham, Hampshire taken over a period of nearly thirty years. These exhibited the range of variation in forewing ground colour and markings that can occur in this species within the same geographical area.

British Microlepidoptera

Beavan, S. D. – *Tebenna micalis* (Mann), Zeal Monachorum (N Devon, VC4) SS7103, 24.ix.2008, at light; *Acrolepiopsis assectella* (Zeller), Zeal Monachorum 26.vii.2008, larvae on *Allium porrum,* moths reared 8 & 12.viii.2008 (new to VC4); *Oegoconia quadripuncta* (Haworth), Zeal Monachorum 28.vii.2007 & 25.vii.2008, at light, genitalia determination (new to VC4); *Gynnidomorpha permixtana* (D.&S.), Braunton Burrows 25.vii.2007, two at light, genitalia determination, (first confirmed Devon record, the other possible Devon record was over 150 years ago); *Lozotaeniodes formosanus* (Geyer), Zeal Monachorum 3 & 20.vii.2007 one at light on each date (new to VC4); *Pammene ignorata* Kuznetsov, Zeal Monachorum 12.vi.2007 one at light, genitalia determination (new to VC and apparently fourth British specimen); *Sclerocona acutellus* (Eversmann), Zeal Monachorum 17.vi.2007 one at light (new to VC 4); *Aethes bilbaensis* (Rössler), Zeal Monachorum (VC4) 24.vii.2008, one at light, genitalia determination (new to the British Isles, Plate 2, Fig. 2).

Beavan, S. D. & Heckford, R. J. – Three species from Braunton Burrows (VC4): *Pancalia schwarzella* (Fabr.), 18 & 26.vii.2008, genitalia determination (new to Devon); *Gynnidomorpha permixtana* (D.&S.), 23.viii.2008, several larvae in seedpods of red bartsia *Odontites vernus*, moths reared 23 & 27.ix.2008, probably the first time that larvae have been found in the British Isles; *Stenoptilia zophodactylus* (Duponchel), 23.viii.2008 (new to VC4).

Bland, K. P. – *Glyphipterix forsterella* (Fabr.), Meall Gruam, Glen Fender, Perthshire NN8968 (VC89) 16.vi.2008 (new to VC); *Diplodoma laichartingella* (Goeze), Auchmithie, Angus NO6844 (VC90), 21.vi.2008, at rest at base of sea-cliff beneath nesting birds (new to VC); *Caryocolum vicinella* (Douglas), Whiting Ness, Seaton Cliffs, Arbroath, Angus NO6641 (new to VC); *Celypha rosaceana* (Schläger), Claymoddie, Wigtonshire NX4136 (VC74) 21/22.vii.2006 at light, by "Grey Daggers" Recording Group. Only two previous Scottish records, both more than 100 years ago, taken only four miles from one of the previous records.

Clancy, S. – *Cydia amplana* (Hb.), New Romney, 31.vii.2007, two of at least three examples; *Mecyna flavalis* (Caradja), Dungeness, 29.vi.2008, first in Kent for over 100 years; *Mecyna asinalis* (Hb.), Dungeness, 22.ix.2008 (another recorded in New Romney on the previous night); *Eurrhypara hortulata* (L.), New Romney, 23.vii.2008, an aberrant specimen showing an extension of the black scaling on both fore and hindwings.

Clarke, J. – *Evergestis limbata* (L.), nr. Falmouth, Cornwall, viii.2008, at mv; *Stenoptilia islandicus* (Staudinger), Loch Tay, Perthshire, v.2008, bred ex larva; *Merrifieldia tridactyla* (L.), Burren, Co Clare, vi.2008; *Emmelina argoteles* (Meyrick), Wicken, Cambridgeshire, ix.2008, bred ex larva; *E. monodactyla* (L.), Wicken, Cambridgeshire, ix.2008, bred ex larva; *Hypercallia citrinalis* Scopoli, Burren, Co. Clare, vi.2008, flying at dawn (5.00h).

Dickerson, B. – *Phyllonorycter leucographella* (Zeller) mines found on beech, *Fagus sylvatica,* in Eynesbury (VC31), 1.x.2008. This is an unusual food-plant for *P. leucographella* which is usually found on members of the Rosaceae. *Caloptilia stigmatella* (Fabr.), Pidley (VC31), 13.x.2008, mine found on the underside of a leaf of white poplar, *Populus alba.* This species usually pupates in a folded leaf-edge, but the exhibit was of a mine on the underside of the leaf which had contained a pupa, along with the pupal case and the moth bred from it. Also photographs of a typical mine and of the pupal cremaster and one of the exhibited mines with the empty pupal case *in situ.* Mines of *Phyllonorycter comparella* (Duponchel) also form

blister mines under the leaves of white poplar, so care must be taken when finding such mines.

DOBSON, A. H. – A selection of 17 species from the 2008 survey of a wetland site, the Hampshire and Isle of Wight Wildlife Trust's Winnall Moors North Reserve, Winchester (VC12), including *Yponomeuta rorrella* (Hb.), *Coleophora striatipennella* (Nylander) (detd. gen. J. Clifton), *Elachista maculicerusella* Bruand, *Phalonidia manniana* (F. v. R.), *Hedya salicella* (L.) and *Eudonia pallida* (Curtis), labelled with their foodplants.

HAMMOND, M. – *Ethmia quadrillella* (Goeze), Woodnewton TL09 (VC32) 5.vii.2008, taken by Nick Smith in his very productive garden mv light trap (new for county); *Uresiphita polygonalis* (D.& S.), Easton Hornstocks TF00, 11.ix.2008, recorded at mv light by Mark Hammond, Keith Tailby and Pete Clarke (new to county).

HARPER, M. – A series of *Yponomeuta padella* (L.) and *Y. malinellus* Zeller. The former is considered to have a fairly extensive distribution across England up to Argyll in Western Scotland since and during the 19th century. In Herefordshire this moth has been declining since 1980 and the last was seen in 1991. A common form has fairly dark grey forewings. Larvae feed on webs on *Crataegus* and *Prunus* spp. *Y. malinellus* closely resembles *Y. padella*, but feeds on apple (*Malus* spp.) exclusively, usually in orchards. Since 1990 the moths and larvae have increased greatly in East Herefordshire especially during 2007 and 2008. The moths usually have silvery-white forewings and cilia. However the cilia can be grey and occasionally there may be patches of grey on the forewings, but in this case these were smaller than in *Y. padella.*

HART, C. – (1) *Stenoptilia inopinata* Bigot & Picard, new to British Isles. As a result of looking through collections and at specimens passed to him, the exhibitor had found some *Stenoptilia* that did not belong to any of the species normally found in this country. Using Microlepidoptera of Europe 1 these appeared to be *S. aridus* (Zeller), but not convincingly so. Ernst Arenberger was consulted and he identified them as *S. inopinata.*

(2) An account of the rediscovery of the plume-moth *S. scabiodactyla* (Gregson). A short series of *S. bipunctidactyla* (Scopoli), *S. annadactyla* Sutter and *S. scabiodactyla* were exhibited. In the 19th century *S. scabiodactyla* was regarded as a dark variety of *S. bipunctidactyla*, but reinstated last century, and this was upheld by Arenberger in 2005. In 2007 the exhibitor noted a dark form of *S. bipunctidactyla* in Rob Dyke's collection. It was female, and was caught at Butterton in Staffordshire. In May 2008 a few larvae on small scabious, *Scabiosa columbaria*, were found there and at nearby localities. These closely resembled *S. annadactyla* both in appearance and habit, feeding by mining the young stems and emerging to feed externally only when nearly fully grown. They were pale greenish-grey and did not have the prominent red dorsal stripe typical of *S. bipunctidactyla.* At the time they were thought to be *S. annadactyla*, though a good two weeks later than that species. The resulting adults were darker than *S. annadactyla* and with more pronounced markings. Male and female genitalia comparisons with those in Pterophoridae 3, in Microlepidoptera Palaearctica confirmed the species as *S. scabiodactyla.*

HECKFORD, R. J. – *Choreutis diana* (Hb.), Glen Affric (VC96) NH2023, four larvae feeding on the upper surface of leaves of two bushes of *Betula* sp., and one found descending from a *Betula* sp. bush and several leaves on another bush with typical feeding signs 2.vii.2007, two moths reared 20 & 21.vii.2007. First British record of larvae found in their feeding place; the only other British record of the

larva was made on 19.vi.1988 by Dr R. P. Knill-Jones who beat a larva in the company of Dr. J. R. Langmaid but did not observe where it was feeding. *Swammerdamia passerella* (Zetterstedt), Ben Wyvis, East Ross (VC106) larvae on *Betula nana* 10.ix.2007, moths reared 3 & 17.xii.2007. *Elachista cahorsensis* Traugott-Olsen, Downas Valley (VC1) SW7616, four larvae mining leaves of *Festuca rubra* 19.vii.2008, moth reared 11.viii.2008. Larva apparently not previously found in the wild. *Gelechia senticetella* (Staudinger), Plympton, Plymouth (VC3), SX5457 exhibitor's garden, 24.vii.2008 one at light, new to Devon. *Spatalistis bifasciana* (Hb.), Budshead Wood, Plymouth (VC3) SX4659, larvae 18.xi.2007, moth reared 14.i.2008; Warleigh Wood (VC3) SX4560 larva 29.xii.2007, moth reared 26.11.2008; Newbridge (VC3) SX7070 larva 29.xii.2007, moth reared 15.iv.2008; near Canonteign Barton (VC3) SX8382 larvae 2.ii.2008, moth reared 10.iii.2008. All larvae amongst dead *Quercus* sp. leaves. *Acleris umbrana* (Hb.), Devil's Point, Plymouth (VC3) SX4653 larvae 25.viii.2007, moth reared 2.x.2007; Rame Head (VC2) SX4148 larva 2.ix.2007, moth reared 27.x.2007; Wembury (VC3) SX5418 larvae 25.viii.2007, moth reared 2.x.2007; Plympton (VC3) 17.vii.2008 one at light. All larvae in spun leaves of *Prunus spinosa*. *Bactra lacteana* Caradja, near An Doirlinn, Lismore, Main Argyll (VC98) NM8038 25.vi.2007, genitalia determination, new to VC98 and second Scottish record. *Crambus uliginosellus* Zeller, near An Doirlinn, Lismore (VC98) 25.vi.2007. New to VC98. *Crambus pratella* (L.), Glen Roy, West Inverness-shire (VC97) NN3491 21.vi.2008. *Eudonia pallida* (Curtis), Dawlish Warren (VC3) SX9879 6.1.2008 six early instar larvae, all about 4 mm long amongst pointed spear-moss *Calliergonella cuspidata*, moths reared 4 & 12.iii.2008. Possibly only the second occasion when the larva has been found in the British Isles. *Pyrausta cingulata* (L.), Downas Valley (VC1) several larvae amongst *Thymus polytrichus* 26.viii.2007, moth reared 19.viii.2008. Larva apparently not previously found in the wild in the British Isles. *Stenoptilia inopinata* Bigot & Picard, Plympton (VC3) 21.vii.1990 at light, new to Devon. This specimen was recently genitalically determined by Dr. E. Arenberger, via Mr C. Hart, who also determined five other British specimens as this species, which is new to the British Isles.

HENWOOD, BARRY – *Epinotia mercuriana* (Frölich), 28.vii.2008, Ben Attow, West Ross (VC105), Scotland; *Coleophora adjunctella* Hodgkinson, Axmouth (VC3) 19.viii.2007, bred 5.vi.2008 ex larva collected on *Juncus gerardii*; *Selania leplastriana* (Curtis), Walls Hill, Torquay (VC3), bred 13.v.2008 ex larva on *Brassica oleracea*, 1.iii.2008; *Monochroa elongella* (Heinemann), Braunton Burrows (VC4) bred 17.vi.2008 ex pupa in *Potentilla anserina* 14.v.2008 (with Dr. P. H. Sterling); *Stigmella paradoxa* (Frey), Orley Common, Ipplepen (VC3) bred 14.iv.2008 ex larva on *Crataegus*, 9.vi.2007.

KNILL-JONES, S. A. – Microlepidoptera from Totland (VC10). *Euchromius ocellea* (Haworth), 25.i.2008 (three), 26 & 28.i.2008 and 7.ii.2008; *Evergestis extimalis* (Scopoli), 25.vii.2008; *Phycitodes maritima* (Tengström), 29.v.2008; *Oncocera semirubella* (Scopoli), 25.vii.2008; *Apomyelois bistriatella* ssp. *subcognata* (Ragonot), 24.vi.2008; *Parapoynx stratiotata* (L.), 23.vii.2008; *Ebulea crocealis* (Hb.), 25.viii.2008; *Pempelia genistella* (Duponchel), 25.viii.2008, *Metzneria metzneriella* (Stainton) 30.vi.2008 (new to VC); *Acleris variegana* (D.& S.), 26.viii.2008; *Plutella porrectella* (L.), 27.vii. & 5.viii.2008.

LANGMAID, J. R. – *Phyllonorycter hostis* Triberti. Four specimens bred from mines on *Malus sylvestris*, Beaulieu Estate (VC11), collected 26.x.2007. Specimens the exhibitor had previously bred from crab-apple were thought to be *P. cydoniella* (D.& S.) but, on dissection, had proved to be *P. hostis*. It is possible, nay probable, that *P. cydoniella* may not occur in Britain. *Caloptilia semifascia* (Haworth), ten

specimens of the second brood bred from spinnings on *Acer campestre* collected in Portsmouth and Southsea (VC11) on 22.viii.2008, emerged 10–16.ix.2008. Exhibited to show the remarkable range of variation in the species. Joint exhibit with I. R. Thirlwell. *Crambus pascuella* (L.), a specimen of ab. *obscurella* Kuchlein, from J. B. Higgott's moth trap at Rushmere St Andrew (VC25), 6.vii.2008.

MASTERS, I. – *Cydia amplana* (Hb.), Middleton-on-Sea SU982004 (VC13), at actinic light-trap 29.viii.2007.

MCCORMICK, R. F. – *Telechrysis tripuncta* (Haworth), Hennock, Devon, 17.vi.2008 at light, B. Bewsher; *Cacoecimorpha pronubana* (Hb.), Saunton Sands, nr Braunton, 1.vii.2008, flowers of ragwort spun together produced adults of this and a *Cnephasia* sp. at the end of July; *Euchromius ocellea* (Haworth), Staplake Mount, Starcross, 27.v.2008 (9th Devon record); *Crambus silvella* (Hb.), Devon 5.viii.2003 (first Devon record, with a more recent one quoted: Uplyme nr Lyme Regis, 2.viii.2008, at light, O. Woodland detd. RFMcC.); *Evergestis limbata* (L.), Teignmouth, 27.vii.2008, at light, the exhibitor observed that the species was appearing on a regular basis at Holcome, near Teignmouth, in his garden in Teignmouth and at Kingsteignton, the home of B. King; *Cynaeda dentalis* (D.& S.), Haven Cliff beach, Seaton, 27.vi.2008, at light, exhibited on behalf of its captor O. Woodland (the exhibitor observes that the species has a strange history in Devon, reportedly seen near Tavistock in 1878 and 1906 where very little foodplant can be found, and with six specimens in the Natural History Museum labelled North Devon, July 1911); *Sclerocona acutellus* Eversmann, Hennock nr Bovey Tracey, 2.vi.2008 and 27.vi.2008, B. Bewsher (7th and 8th Devon records. The species being associated with importation from the Balkans in thatching material.)

MITCHELL, A. R. – *Diaphania perspectalis* (Walker) (Plate 2, Fig. 11), new to Britain, Weybridge, Surrey (VC17) TQ0864, 4.ix.2008, mv light trap. From China, Korea and Japan, a pest of Box *Buxus* spp. Larvae found in Germany and adults in the Netherlands in 2007. Two further adults reported from East Sussex in late September 2008.

PARSONS, M. S. – *Euchromius ocellea* (Haworth), Walditch (VC9), 23 & 29.i.2008; *Spoladea recurvalis* (Fabr.), Eype's Mouth (VC9), 13.x.2008; *Diaphania perspectalis* Walker, Icklesham (VC14), 23.ix.2008. Exhibited on behalf of Kevin Thornton, Phil Jones and Ian Hunter.

SHERMAN, N. – Specimens representing new site records and putative new site records from Ipswich golf course TM208432 (VC25). *Oncocera semirubella* (Scopoli), 5.viii.2008 (scarce migrant in Suffolk); *Conobathra tumidana* (D.& S.) ♀, 25.viii.2008 (scarce migrant in Suffolk); *Ancylosis oblitella* (Zeller), 28.viii.2008 (a scarce resident in Suffolk, mainly found on the coast); *Vitula biviella* (Zeller), 22.vii.2008 (first noted in 2007 when 71 were recorded. In 2008 30 more were seen, suggesting that it is now possibly resident); *Agonopterix conterminella* (Zeller), 6.viii.2008 (only the second modern record for Suffolk); *Carpatolechia notatella* (Hb.), 14.vii.2008 (if confirmed, would be the first Suffolk record for over 70 years); *Carpatolechia fugitivella* (Zeller), 22.vii.2008 (if confirmed this would be only the second modern record from Suffolk). A description of the discovery and determination of a specimen of *Nemapogon falstriella* (Haas) at Ipswich Golf Course on 8.viii.2007, together with a photograph of the moth – a species new to the British Isles.

SIMS, I. – *Ectoedemia heringella* (Mariani), adults and cocoons, ex larvae from holm oak, *Quercus ilex*, Jealott's Hill, Berkshire, 13.ii.2007 (new to VC22); *Stigmella carpinella* (Heinemann), 2 adults and cocoons from hornbeam, *Carpinus betulus*, obtained as larvae from Old Pond Copse, Reading, Berkshire, 28.ix.1998, hatched 8.iv.1999, having been over-wintered in the garden, and from Bear Wood,

Wokingham, Berkshire, 25.vi.2008, hatched 12.vi.2008 (first VC22 records, but not recognised as such at the time); *Nemapogon variatella* (Clemens), adults reared from the bracket fungus *Ganoderma adspersum* on dead white horse-chestnut tree, *Aesculus hippocastanum*, Henley-on-Thames, Oxfordshire, 14.iv.2008, reared 24.iv. to 3.v.2008 (first VC23 record); *Caloptilia populetorum* (Zeller), ex larva on silver birch, *Betula pendula*, Dinton Pastures Country Park, Hurst, Reading (VC23) 16.x.2008 reared 21.x.2008; *Caloptilia hauderi* Rebel, adult and the mines, larval folds and cocoon on field maple, *Acer campestre* from Oxfordshire 17.vi.2008, reared 27.vi.2008, also a hymenopterous parasite of the same (new to VC23); *Calybites phasianipennella* (Hb.), adults, mines and cones on redshank, *Polygonum persicaria,* growing in field margins near Bear Wood, Wokingham (VC22) on 27.ix.2008 and at Jealott's Hill (VC22) on 1.x.2008 and reared later in October; *Parornix carpinella* (Frey), larval mines and folds on hornbeam, from Lower Earley, Reading 21.ix.2008, Jealott's Hill, 26.ix.2008 and Dinton Pastures, 27.ix.2008 (new to VC22); *Phyllonorycter comparella* (Duponchel), adults and mines in white poplar, *Populus alba,* Royal Horticultural Society Garden, Wisley, Surrey 30.ix.2006, reared 1.x.2006; *Glyphipterix forsterella* (Fabr.), Dinton Pastures Country Park, Hurst (VC22) 23.v.2008 and Lower Earley, Reading (VC22), 20.v.2007; *Argyresthia trifasciata* Staudinger, Jealott's Hill (VC22), 27.v.2008, put up from cultivar juniper; *A. brockeella* (Hb.), *A. goedartella* (L.), *A. pygmaeella* (D.& S.) and *A. curvella* (L.) from Berkshire; *A. retinella* Zeller from Bucks.; *A. glaucinella* Zeller from Essex; *A. spinosella* (Stainton), *A. conjugella* Zeller, *A. semifusca* (Haworth), *A. pruniella* (Clerck), *A. bonnetella* (L.), *A. albistria* (Haworth), *A. semitestacella* (Curtis), *Yponomeuta evonymella* (L.), *Y. padella* (L.) and *Y. cagnagella* (Hb.) from Berkshire; *Y. sedella* Treitschke from Warburg Nature Reserve, Bix, Oxfordshire, 5.viii.2000 and a cocoon from a larva on orpine, *Sedum telephium*, RHS Garden, Wisley, Surrey 30.ix.2006 reared 19.iv.2007; *Pseudoswammerdamia combinella* (Hb.) from Oxfordshire; *Swammerdamia caesiella* (Hb.) from Hampshire; *S. pyrella* (Villers) from Buckinghamshire; *S. compunctella* (H.-S.), Bear Wood, Wokingham (VC22) 27.iv.97, beaten from lime; *Paraswammerdamia albicapitella* (Scharfenberg), *P. lutarea* (Haworth), *Prays fraxinella* (Bjerkander) and *Scythropia crataegella* (L.) from Berkshire; *Metriotes lutarea* (Haworth), Jealott's Hill (VC22), adults at flowers of greater stitchwort, *Stellaria holostea*, 14 & 21.5.2008, larval cases 1 & 11.vi.2008 (first VC22 records since 1924); *Dystebenna stephensi* (Stainton), Jealott's Hill (VC22) 26.vi.2008 to 16.vii.2008 and one reared from oak bark Lower Earley, Reading (VC22) collected on 19.vi.2008 and emerged 27.vi.2008 (new VC records).

STIRLING, P. H. – *Epermenia chaerophyllella* (Goeze), Weymouth (VC9). Very young larva on tree mallow, *Lavatera arborea,* collected 26.v.2008, adult emerged 26.vi.2008. Normally the larva is observed only on plants in the Apiaceae. *Acleris umbrana* (Hb.), West Bexington (VC9), 6.vii.2008, at mv light. First record in Dorset (VC9) since about the 1960s. *Pammene ochsenheimeriana* (Lienig & Zeller), Chedington Woods (VC9), 16.v.2008, beaten by day from Norway spruce tree, by B. P. Henwood & P. H. Stirling, new to Dorset (VC9). *Dichrorampha senectana* Guenée, Gad Cliff (VC9), larva in root of ox-eye daisy, *Leucanthemum vulgare*, collected 25.iv.2008, adult emerged 5.vi.2008. First record in Dorset (VC9) since the 1880s.

SWIFT, S. – *Lozotaenia forsterana* (Fabr.), Gosport (VC11) 8.vi.2008. Found by Mrs. Pat Clipston floating in a rain-water butt. It is provisionally considered that this may be an unusual form of this species, subject to genitalia verification.

THIRLWELL, I. R. – *Cydia splendana* (Hb.), an interesting colour form, Portsmouth (VC11) 27.viii.2008; *Assara terebrella* (Zincken), Portsmouth (VC11) 28.vii.2008. In Hampshire this species is recorded mostly from the New Forest.

TUNMORE, M. – *Herpetogramma licarsisalis* (Walker), one on The Lizard (VC1) 11.x.2008 and one near St Buryan (VC1) 11.x.2008, N. Beasley (fifth and sixth British records); *Euchromius ocellea* (Haworth), two, West Cornwall (VC1), 28.i.2008 (part of the biggest influx of this species yet recorded in Britain, which included a total of 45 recorded on the Lizard).

CHANNEL ISLANDS LEPIDOPTERA

CORDELL, P. A. – A selection of moths collected in Jersey in 2006, 2007 & 2008: *Peribatodes umbraria* (Hb.), a new species for Britain and the Channel Islands. A single female was taken in the rough of the golf course at Grouville on 10.x.06. This specimen has been donated to the Jersey Museum. A male and female from Magulades, Kerkira, Greece, were shown for comparison. *Pseudoterpna coronillaria* (Hb.), 5.vii.06 & 2, 16.vii.08, including a melanic form, Gouray. *Idaea rusticata* (D. & S.), 16.v.08, Gouray. *Idaea ochrata* (Scop.), 12.vii.07 & 16.vii.08, Gouray. *Cyclophora ruficiliaria* (L.), bred, emerged 29.vi.06, ex female 2.v.06, Waterworks Valley, St Lawrence. *Zygaena trifolii* (Esp.), bred, emerged 9.vi.06, from cocoons high up grass stems 21.v.06, Les Meilles. *Scotopteryx peribolata* (Hb.), 5.ix.07, Le Catillon. *Coscinia cribraria* f. *arenaria* (Lempke), 29.viii.07, Les Meilles. *Thaumetopoea processionea* (L.), 5.ix.07, Le Catillon. *Agrotis crassa* (Hb.), 10.vii.07 & 5.ix.07, Gouray. *Agrotis graslini* (Rambur), 5.ix.07, Le Braye, St Ouens Bay. *Trachea atriplicis* (L.), 10.vii.07 & 12.vii.07, Gouray. *Trigonophora flammea* (Esp.), 9.x.06 & 20.x.06, Gouray. *Mythimna putrescens* (Hb.), 5.ix.07, Le Braye, St Ouens Bay. *Lacanobia splendens* (Hb.), 6.vii.08, Gouray. *Polyphaenis sericata* (Esp.), 16.vii.08, Gouray. *Acronicta megacephala* (D. & S.), 5.ix.07, Gouray. *Polymixis flavicincta* (D. & S.), 5.x.06, Noirmont. *Platyperigea kadenii* (Freyer), bred, emerged 24.xii.06, ex female 10.x.06, Gouray. *Hypena obsitalis* (Hb.), 5.ix.07, St Aubin & 9.x.06, Les Blanches Banques.

COSTEN, P. D. M. & STERLING, P. H. – Two moths from Guernsey (VC 113): *Cerura erminea* (Esp.), 8.vi.07, La Claire Mare, at mv light, by PDMC, identified by PHS in Costen collection after mention of the species being found on Jersey in 2008. *Dryobotodes tenebrosa* (Esp.), La Claire Mare, at mv light on 20.9.08, by P. D. M. Costen & P. H. Sterling; one of many seen on Guernsey in autumn 2008.

FOREIGN LEPIDOPTERA

CORLEY, M. F. V. – New and interesting Lepidoptera from Portugal in 2008: 22 species new to Portugal were exhibited, mainly collected in 2008 by the exhibitor and his friends Pedro Pires and Eduardo Marabuto, who were thanked for allowing use of their finds. Some, marked with an asterisk in the list that follows, had been listed for Portugal previously, but the records were erroneous. Three species were new to the Iberian Peninsula: *Coleophora violacea* (Ström), *Cosmardia moritzella* (Treitschke) and *Strophedra nitidana* (Fabr.). The others were: **Depressaria douglasella* Stainton, *Coleophora galbulipennella* Zeller, ex larva on *Silene nutans*, *C. striatipennella* Nylander, *Mompha locupletella* (D. & S.), *Ditula joannisiana* (Ragonot), (shown with *D. angustiorana* (Haworth) and *Avaria hyerana* (Millière) for comparison), **Gypsonoma dealbana* (Fröhlich), *Cydia gilviciliana* (Staudinger), *Scotomerodes syriacalis* ssp. *oranalis* (Zerny), *Sciota rhenella* (Zincken), *S. rungsi* Leraut, *Pempelia albariella* Zeller, *Trachycera suavella* (Zincken), ex larva on *Crataegus*, *Bazaria ruscinonella* Ragonot, **Scoparia basistrigalis* Knaggs, **Eupithecia schiefereri* Bohatsch, (shown with *E. venosata* (Fabr.) for comparison), *E. subfuscata*

(Haworth), *E. millefoliata* Rössler, *Hadula gredosi* Laever, and *Eilema marcida* (Mann). Eight species were also exhibited that had only been recorded once before in Portugal: *Athrips rancidella* (H-S), ex larva on *Crataegus, Aethes tesserana* (D. & S.), *Oxypteron schawerdai* (Rebel.), *Phycita torrenti* Agenjo, *Vitula biviella* (Zeller), *Synopsia sociaria* (Hb.), *Eupithecia spadiceata* Zerny and *Lithostege griseata* (D. & S.). Many of these species are widely distributed in Europe, but *Ditula joannisiana, Cydia gilviciliana, Scotomerodes syriacalis* ssp. *oranalis, Sciota rungsi, Bazaria ruscinonella* and *Eilema marcida* are western Mediterranean species, *Oxypteron schawerdai, Phycita torrenti* and *Hadula gredosi* are Iberian endemics, the latter with very few records, and *Cosmardia moritzella* is a local species of parts of central and north Europe. The nomenclature of *Ditula joannisiana* and *Scotomerodes syriacalis* is unresolved. *D. joannisiana* is currently also referred to the genus *Batodes*, or alternatively is treated as a synonym of *Avaria hyerana* (Millière), from which it differs in several important characters. Placement in the same genus as *Ditula angustiorana* (Haworth) seems inappropriate as the latter species has filiform antennae, strongly marked forewings and significant sexual dimorphism. *Scotomerodes syriacalis* is also treated under the name *fuliginosalis* Zerny. Recent authors have included it in *Aglossa* and *Zitha*, in addition to *Scotomerodes*. The subspecies *oranalis* is western Mediterranean, and the typical subspecies is in the eastern Mediterranean area. Two exotic species which have become established in Portugal, and are now spreading, were also exhibited: *Opogona omoscopa* (Meyrick), which is rapidly becoming widespread, and *Blastobasis decolorella* Wollaston, a Madeiran endemic which is now spreading around Lisbon and Porto. This is not the species long known to British lepidopterists as *B. decolorella*.

HALL, N. M. – (1) Butterflies from Fuerteventura (Canary Islands), Nov–Dec 2007, 'Serendipity on Fuerteventura': *Danaus chrysippus* L., 5 bred, emerging 16–21.xii.2007, Giniginámar, Fuerteventura, ex larvae 23 & 27.xi.2007 on *Calotropis procera* (Asclepiadaceae). NMH explained how a series of coincidences led him to discover a strange plant, new to him, which just happened to be a suitable foodplant for *D. chrysippus*. He had no intention whatever of looking for larvae on the day the first was found, and admits to being far more excited by the plant than the larva. He has, even now, never seen *D. chrysippus* flying on Fuerteventura. NMH had, by chance, while on the island, found a German edition of Noel Rochford's excellent walking and motoring guide 'Landscapes of Fuerteventura' (Sunflower Books), containing walks not in his own edition, and this led him to visit a particularly barren part of the island with a colleague, David Algar (DJA). The walk was supposed to be from Tarajalejo to Giniginámar, but was never completed because of the danger of being catapulted into the sea from a great height from one particularly vertiginous stretch of the path. However, near the point where they turned back, they encountered some plants, 3–4 m high, with opposite, fleshy, ovate leaves, up to about 15 cm long, and with stems vaguely like cabbage stems, growing at the edge of a dried up watercourse (a *barranco*). NMH couldn't think what species it could possibly be. However, when leaves were broken off, milky juice squirted out, suggesting that it was in Euphorbiaceae or Asclepiadaceae, and yet he knew it was not illustrated in any of his botanical guides to the Canary Islands. DJA then noticed that one of the leaves was covered with hundreds of tiny yellow spiders, and, on closer inspection, found a very small larva at the edge of the leaf, looking half dead and seemingly stuck in exuded milk, which NMH realised must be a larva of *D. chrysippus,* because of its similarity to *D. plexippus* larvae he had found on Gran Canaria. Since both of these feed on asclepiads, the plant was an asclepiad and thus

relatively easy to identify after returning to England as *Calotropis procera*. Four or five days after collecting the first larva, NMH & DJA went by road to Giniginámar, to search for more of the plant, and found that young plants were fairly common within 2 km of the sea especially at the edges of roads and fields, where it often grew in the company of Tree Tobacco. One very mature example was then found – a large, spreading tree with multiple trunks and conspicuous purple flowers. Four more small larvae were collected from this tree, and some flowers and leaves were taken as foodplant. All 5 larvae pupated in Fuerteventura. The hanging pupae were detached from their supports (usually just a silk pad spun under the lid of a plastic box), and packed in rice to stop them being shaken about during the journey home. They travelled as hand luggage, and were put through the X-ray machine. The first butterfly emerged on 16.xii.2007, only five days after returning home, and all the others had emerged after another five days. On returning home, NMH put 'Calotropis procera Fuerteventura' into Google and turned up a paper (in English) saying that *Calotropis procera* was a North African plant, now invading Fuerteventura, 'which has now established itself in the valley of Giniginámar'. There were even photographs of *chrysippus* larvae. [Dietmar Brandes (2005): http://www.biblio.tu-bs.de/geobot/calotropis.pdf] So nothing new after all – but still very satisfying, because entomological knowledge had helped to solve a botanical problem. Referring to Marcos Báez, 'Mariposas de Canarias', 1998, NMH then read that 'the colonization of the Canaries by *chrysippus* was 'from the Asiatic populations and not from the Tropical African populations'. He does not know the evidence for this, and can see no reason why the population on the east side of Fuerteventura should not have come from Africa, like the *Calotropis*. Fuerteventura is the Canarian island closest to the African coast, and Giniginámar is near the closest point of all on Fuerteventura to Africa, which is by the magnificent lighthouse 'La Entallada'.

(2) Moths of Fuerteventura (Canary Islands): (i) *Anomis* (=*Cosmophila*) *flava* Fabr. A common noctuid moth (Ophiderinae), but behaviour and colour alone might suggest a geometrid moth. Males and females differ in both wing pattern and wing shape. A second *Anomis* species, *A. erosa* Hb., said to be difficult to distinguish from *A. flava*, is recorded from the Canary Islands, and is illustrated by Báez, 'Mariposas de Canarias', 1998 – but NMH has never seen it and believes that it must be much less common than *A. flava*. (ii) *Agrotis lanzarotensis* Rebel. This is the commonest agrotid moth on Fuerteventura in winter, and both sexes come readily to light. The males are sand coloured but the females are mostly dark and have many forms. They lay eggs freely and the larvae feed up quickly on Dock – but keeping fully grown larvae through the summer is a problem NMH has yet to solve. (iii) *Casama innotata* Walker. This lymantriid moth is related to *Laelia coenosa* Hb, Reed Tussock, and feeds on Acacias. (iv) *Pandesma robusta* Walker. A common noctuid moth on Fuerteventura, and also seen less commonly in southern Spain. Often seen sitting near low energy light bulbs in hotel complexes. (v) *Ophiusa tirhaca* Cramer. The distribution of this spectacular species stretches into southern France. It is associated with *Pistacia*. (vi) *Hyles tithymali* Boisd. Two with differing jizz, but the Spurge Hawk-moths on the Canary Islands are, apparently, all *tithymali*. (vii) *Cardepia affinis* (Rothschild), but thought at the time of the exhibition to be *Anarta* (*Aglossestra*) *deserticola* Hampson. (viii) *Herpetogramma licarsisalis* Walker. A small brown example. Some very fresh specimens are almost black; *licarsisalis* is primarily a New-World species, but is now turning up even in Britain. NMH did not see it in the Canary Islands until 1997, when it suddenly became common, and he has seen it on every subsequent visit. It is quite likely to turn up *inside* hotel apartments,

PLATE 1.

1: *Argynnis paphia* ab *confluens*, bred K. E. J. Bailey. 2: *Argynnis paphia* extreme ab *nigricans*, bred K. E. J. Bailey. 3: *Arctia caja* (2 specimens) bred A. Jenkins. 4: *Polyommatus coridon* ab. *discoelongata*, Dorset, 23.vii.2008, Shirley Rook. 5: *Lycaena phlaeas* approaching ab *antiradiata*, bred 21.ix.2008, A. M. Jones. 6: *Pieris rapae*, suffused undersides, bred 15.iii.2008, A. M. Jones. 7: *Aglais urticae* pale form, bred, K. E. J. Bailey. Scale bar 10 mm.

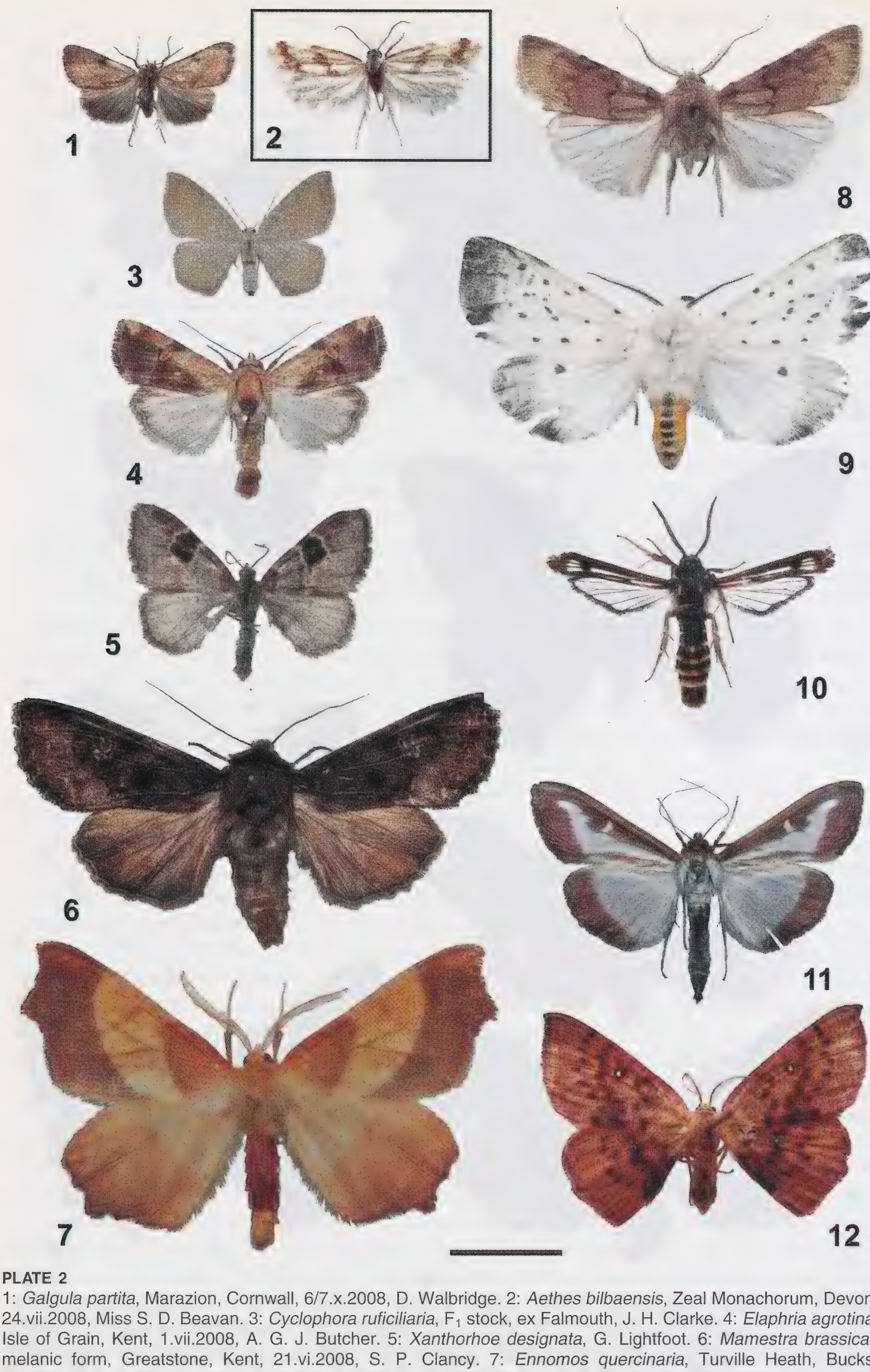


PLATE 2

1: *Galgula partita*, Marazion, Cornwall, 6/7.x.2008, D. Walbridge. 2: *Aethes bilbaensis*, Zeal Monachorum, Devon, 24.vii.2008, Miss S. D. Beavan. 3: *Cyclophora ruficiliaria*, F_1 stock, ex Falmouth, J. H. Clarke. 4: *Elaphria agrotina*, Isle of Grain, Kent, 1.vii.2008, A. G. J. Butcher. 5: *Xanthorhoe designata*, G. Lightfoot. 6: *Mamestra brassicae* melanic form, Greatstone, Kent, 21.vi.2008, S. P. Clancy. 7: *Ennomos quercinaria*, Turville Heath, Bucks, T. Harman. 8: *Agrotis segetum*, Bawdsey, Suffolk, 27.vii.2008, M. Deans. 9: *Spilosoma lubricipeda*, Devon 2008, R. McCormick. 10: *Pennisetia hylaeiformis*, Meldreth, Cambridgeshire, 2007, J. Reid. 11: *Diaphania perspectalis*, Weybridge, Surrey, 4.ix.2008, A. R. Mitchell. 12: *Cyclophora puppillaria*, Totland, Isle of Wight, 6.v.2008, S. A. Knill-Jones. Scale bar 10 mm for Figs, 1, 3–12.; 5 mm for Fig. 2.

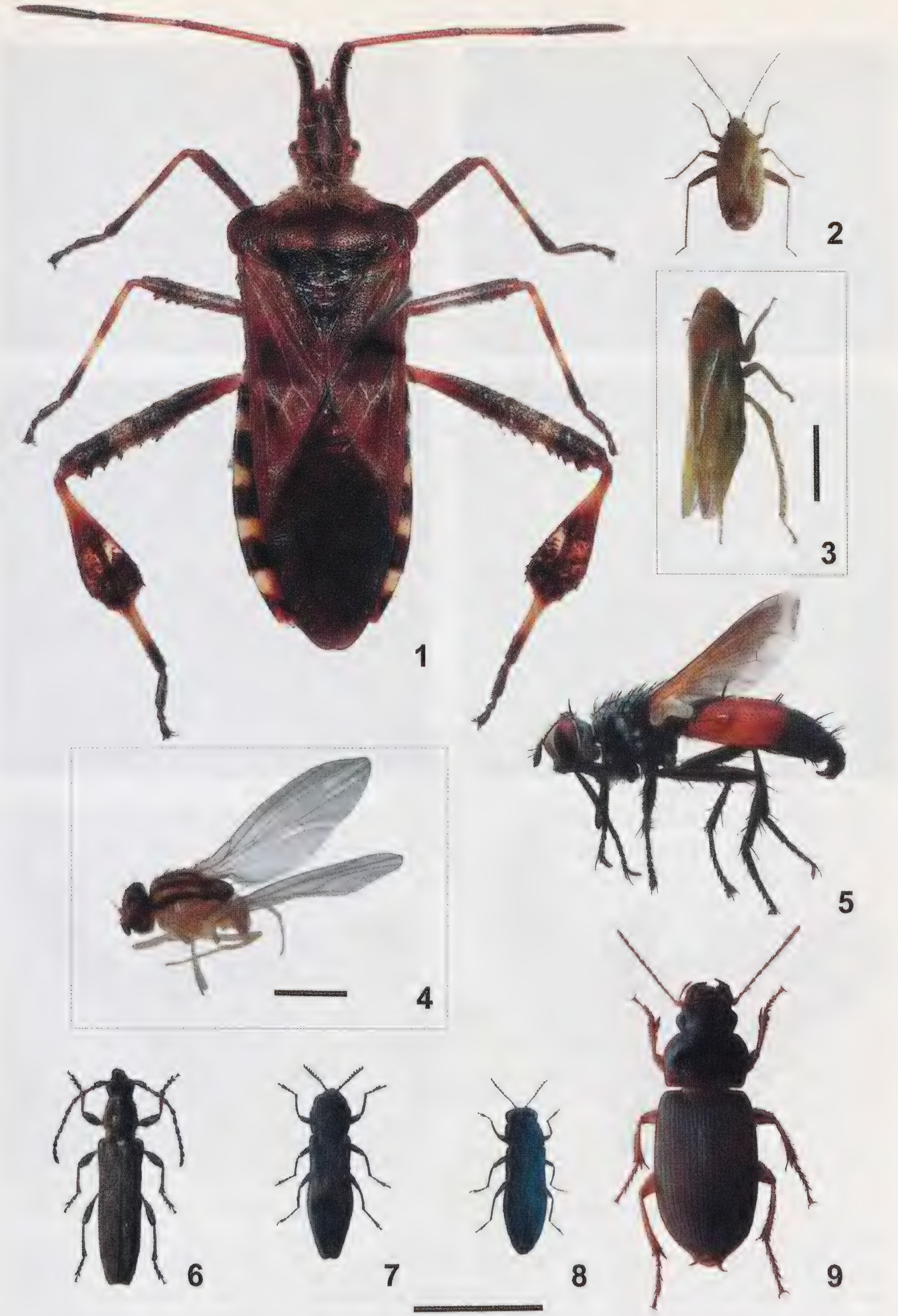


PLATE 3

1: *Leptoglossus occidentalis*, Dungeness, Kent, 30.viii.2008, S. P. Clancy. 2: *Macrotylus horvathi*, Thamesmead, Kent, 20.viii.2008, P. J. Hodge. 3: *Liguropia juniperi*, Kingston-upon-Thames, Surrey, 15.ix.2008, A. J. A. Stewart. 4: *Hirtodrosophila trivittata*, Longleat, Wiltshire, 30.viii.2008, D. J. Gibbs. 5: *Cylindromyia brassicaria*, Lizard, Cornwall, 11.vii.2008, I. Perry. 6: *Deilus fugax*, Ashford, Kent, 20.v.2008, M. Ashby. 7: *Agrilus cuprescens*, Beckton, Essex, 8.vi.2008, P. J. Hodge. 8: *Agrilus cyanescens*, Beckton, Essex, 8.vi.2008, P. J. Hodge. 9: *Harpalus griseus*, Thetford, Norfolk, viii–ix.2008, M. Ashby. Scale bars for Figs 3 & 4, 1 mm; all others, 5 mm.

PLATE 4.

1: *Philaenus spumarius*, f. *praeusta*, Hebdon Bridge, SW Yorks, 15.viii.2008. Photo: Colin Duke. 2: *Proscopus pulchripennis*, Dell Quay, West Sussex, 23.vii.2009. Photo: Jonty Denton. 3: *Nezara viridula*, late instar nymph, Colindale, London. Photo: John Starr. 4: *Emmelina argoteles*, Wicken Fen, Cambs, 24.vi.2006. Photo: Jeff Higgott. 5: *Emmelina argoteles*, male genitalia. Photo: Brian Goodey. 6: *Emmelina monodactyla*, male genitalia. Photo: Jeff Higgott.

particularly in the bathroom, so before it was formally identified at the BMNH, NMH coined his own name 'The Bath Moth'. (ix) An unidentified pyralid moth. This moth had an unusual wing venation, accentuated by the presence of some grease, and may be in the Peoriinae. No Peoriinae are listed in Báez, loc. cit.

HARMAN, A. – Some of the rarer species of Sphingidae from the Indo-Australian region: *Ambulyx joiceyi* Clark (Borneo), *Amplypterus mansoni* Clark (Thailand), *Clanis hyperion* Cadiou & Kitching (Thailand), *Coequosa triangularis* Don. (Australia), *C. australasiae* Don. (Australia), *Rhodoprasina corrigenda* Kitching & Cadiou (Thailand), *R. floralis* Butl. (Thailand), *Anambulyx elwesi* Druce (Nepal), *Phyllosphingia dissimilis perundulans* Swin. (Thailand), *Marumba saishiuana* Okamoto (Thailand), *Tetrachroa edwardsi* Olliff (Australia), *Theretra radiosa* Rothschild & Jordan (Papua), *T. brunnea* Semper (Sulawesi), *T turneri* Lucas (Australia), *T. griseomarginata Hamps.* (Nepal), *Barbourion lemaii* Le Moult (Thailand), *Compsulyx cochereaui* Viette (New Caledonia), *Langia tropicus* Moulds (Australia), *Sataspes ribbei* Röber (Sulawesi), *S. tagalica* Boisd. (Nepal), *Cechenena mirabilis* Butl. (Nepal), *Pentateucha curiosa* Swin. (Thailand), *Hopliocnema brachycera* Lower (Australia), *Griseosphinx preechari* Cadiou & Kitching (Thailand), *Synoecha marmorata* Lucas (Australia), *Morwennius decoratus* Moore (Nepal).

HONEY, M. R. – Balearic Islands Coleophoridae: Cuello (1981, Els Lepidòpters de les Illes Balears. Cens provisional) lists just three species of Coleophoridae from the Balearic Islands, now named *Coleophora vestalella* Staudinger, *C. albicostella* Duponchel and *C. crepidinella* Zeller. Two more species are listed for the Balearic Islands on the Fauna Europaea (FauEu) website (*Goniodoma limosiella* Stainton and *C. kahaourella* Toll) and a few more have been picked up from various publications (e.g. *Coleophora hieronella* Zeller). MRH's own list, compiled over the last few years, mainly from specimens collected in the Parc Natural de s'Albufera, Mallorca, now stands at 31 species, but a few of the determinations are preliminary, pending further specimens/study. A selection of these species was exhibited, along with the most recent addition to the list. Many are familiar species that occur also in the UK but some species have a more Mediterranean distribution. In May 2008, during a visit to the Parc by BENHS members, larval cases of an unknown coleophorid were found by Richard Lyszkowski on *Ulmus* leaves. Based on the foodplant and the appearance of the cases, *Coleophora limosipennella* Duponchel was the most likely, but this species was not known from the Balearic Islands – or even from the Iberian peninsula. Further searching revealed a patchy distribution of cases, sometimes numerous on a particular tree. A few cases were collected and brought back to the UK to rear out the adult in order to confirm the tentative identification. The first adult to emerge did so on 27.vi.2008 and was dissected, confirming MRH's tentative identification.

PICKLES, A. J. – Moths from the polar mountains of Norway and Sweden: (1) photographs were shown of (i) a helicopter trip across Lake Torneträsk in North Sweden to Boarrásacohkka, a mountain on the Norwegian Border of some 880 metres; (ii) the Boarrásacohkka habitat; (iii) *Sympistis nigrita zetterstedtii* (Staudinger) *in copula* next to *Dryas octopetala* the supposed foodplant and (iv) *Xestia* (*Anomogyna*) *alpicola alpicola* (Zetterstedt) at rest. (2) Lake Torneträsk in North Sweden has a road on the south side which was opened in the 1960s but no road on the north side of this huge lake. Because the mountains to the north enjoy more sunshine during the twenty four hour daylight of midsummer there are more Lepidoptera there than to the south. It is estimated that it would take up to three days to trek to the most propitious areas, but AJP & Alec Harmer learned that Swedish collectors habitually make the journey by helicopter and did the same this

July. They were rewarded with most of the species available at this mid altitude but needed to return to the higher mountains to see the remaining montane species. (3) The following moths were exhibited, from the mountains of northern Sweden and Norway, showing parallels of form and pattern across a range of taxonomic groups which presumably arose as an adaptation to the prevalent harsh Arctic conditions: (i) Geometridae, Ennominae. *Glacies coracina* (Esper), various localities. This common moth reached sea level at Porsanger on the Arctic Ocean. (ii) Geometridae, Larentiinae. *Entephria polata* (Duponchel). Björkliden, 504 m, Torne Lappmark (=TO), Sweden. *Psychophora sabini* Kirby. Grønåsen. 431 m, Gargia, Finnmark (=F), Norway. (iii) Noctuidae, Oncocnemidinae. *Sympistis funebris* (Hb.). Krokvik. 479 m., TO, Sweden. *S. lapponica* (Thunberg). Boarrásacohkka, TO, Sweden. *S. heliophila* (Paykull). Localities from North Sweden to the Arctic Ocean. *S. nigrita* (Boisduval) ssp. *zetterstedti* (Staudinger). Boarrásacohkka, TO, north Sweden. (iv) Noctuidae, Hadeninae. *Anarta* (*Calocestra*) *melanopa* Thunberg. Grønåsen, 431 m, Gargia, F, Norway. *Lasionycta staudingeri* (Aurivillius). Grønåsen, 431m, Gargia, F, Norway. (v) Noctuidae, Noctuinae. *Xestia* (*Schoyenia*) *quieta,* (Hb.). Grønåsen, 431 m, Gargia, F, Norway.

TERRY, R. – Moths of the Pyrénées-Orientales, France: Essex Emerald, *Thetidia smaragdaria* (Fabr.), Sussex Emerald, *Thalera fimbrialis* (Scop.), Lewes Wave, *Scopula immorata* (L.), Sub-angled Wave, *Scopula nigropunctata* (Hufn.), Tawny Wave, *Scopula rubiginata* (Hufn.), Bright Wave, *Idaea ochrata* (Scop.), *Idaea moniliata* (D.& S.), *Cyclophora lennigiaria* (Fuchs), *Cymbalophora pudica* (Esp.), *Rhegmatophila alpina* Bellier, *Albocosta musiva* (Hb.), *Aedia leucomelas* (L.), *Eremodrina oberthuri* (Rothschild), *Thysanoplusia daubei* (Boisd.), *Panchrysia v-argenteum* (Esp.), Southern Rustic, *Rhyacia lucipeta* (D.& S.), Large Dagger, *Acronicta cuspis* (Hb.), Berber, *Pseudenargia ulicis* (Stdgr), *Hoplodrina respersa* (D.& S.), Powdered Rustic, *Hoplodrina superstes* (Ochs.), Clancy's Rustic, *Platyperigea kadenii* (Freyer), Lorimer's Rustic, *Paradrina flavirena* (Guenée), *Caradrina proxima* Rambur, Bloxworth Snout *Hypena obsitalis* (Hb.), *Hypena lividalis* (Hb.), *Catocala nymphaea* (Esp.).

DIPTERA

ALEXANDER, K. N. A. – *Heteromeringia nigrimana* (Loew) (Clusiidae), a rare saproxylic fly from Dunham Park, Cheshire (SJ7487), knocked from an aerial dead branch on open-grown oak tree, 23.vi.2008; only six previous British records from across southern England.

BOYD, G. – *Choerades marginatus* (L.) (Asilidae), Glapthorn, Cow Pastures Reserve, VC 32, TL0030, 30.vii.2006 and seen at two other woodland sites in Northants since that date; *Neoascia podagrica* (Fabr.) (Syrphidae), Auchencairn, just above strand line, VC 73, NX8051, 5.viii.2008, a mating pair on *Sinapis arvensis* flowers; *Phasia hemiptera* (Fabr.), Nassington, Ring Haw Reserve (by Field Centre), VC 32, TL0597, 23.vii.2008, at *Heracleum* flowers on a very warm humid afternoon.

CHANDLER, P. J. – *Crataerina pallida* (Olivier in Latreille) (Hippoboscidae), a flightless fly fallen from the skies of Wiltshire in 2008: this parasite of the swift *Apus apus* was found crawling on the exhibitor immediately after returning home to Melksham from an afternoon visit to Trowbridge; it was concluded that it had either fallen from a passing swift or dropped from a nest.

CROSSLEY, R. – Some noteworthy flies of the North York Moors National Park, found in 2008: *Ibisia marginata* (Fabr.) (Athericidae), new to Yorkshire and probably to north-east England, several specimens in the vicinity of a shaded

moorland stream; *Tabanus sudeticus* Zeller (Tabanidae), swept from lush vegetation in a moorland bog, found very infrequently in Yorkshire with all records from the North York Moors, this the first found by the exhibitor; *Platycheirus sticticus* (Meig.) (Syrphidae), an enigmatic and easily overlooked species, the first found (or recognised!) by the exhibitor in fifty years of collecting; *Sphaerophoria virgata* Goeldlin de Tiefenau (Syrphidae), new to Yorkshire, Rosekirkdale Fen, a calcareous site in plantation forest; *Sphegina sibirica* Stackelberg (Syrphidae), from a moorland valley in the extreme north-east of Yorkshire and the second county record, the first Yorkshire record was from Upper Nidderdale in the high Pennines in 2005 and it must surely occur at sites between; *Xanthandrus comtus* (Harris) (Syrphidae), of three specimens found by sweeping bushes in the vicinity of a richly vegetated moorland bog at the end of August, two were teneral, indicating that they had had developed in the vicinity.

DICKSON, R. J. – Nine species from South Hampshire (VC 11) in 2008, the first seven taken in a Malaise trap at Titchfield Haven NNR (SU5302): *Odontomyia tigrina* (Fabr.) (Stratiomyidae), 31.v/1.vi; *Oxycera trilineata* (L.) (Stratiomyidae), 18/19.vii; *Stratiomys potamida* (Meig.) (Stratiomyidae), 6/7.vi; *Chrysotus suavis* Loew (Dolichopodidae), 25/26.v and 1/2.vi; *Dolichopus andalusiacus* Strobl (Dolichopodidae), 14/15.viii and 22/24.viii, among the more common dolichopodids at the trap, reed *Phragmites australis* appeared to be a common factor between sites for this species; *Ethiromyia chalybea* (Wied.) (Dolichopodidae), 35/26.v; *Nematoproctus distendens* (Meig.) (Dolichopodidae), 1/2.vii and 30/31.vii; *Leopoldius signatus* (Wied. in Meig.) (Conopidae), Warsash shore (SU4905), 21.x., at ivy *Hedera helix* blossom and Cams Bay, Fareham (SU5805), 1.x, several seen on sunlit foliage, leg. K. J. Wheeler; *Crataerina pallida* (Olivier in Latreille) (Hippoboscidae), Bishop's Waltham area (SU5517), reared from puparia taken from nest of swift *Apus apus* in July 2006, emerged spring 2008.

GIBBS, D. – Scarce Diptera collected in 2008: *Diogma glabrata* (Meig.) (Cylindrotomidae), Ashton Gate, Bristol, Somerset (ST5469), 21.vii; *Macrocera crassicornis* Winnertz (Keroplatidae), Elveden (Center Parcs), Suffolk (TL8080), 21.ix; *Ectrepesthoneura colyeri* Chandler (Mycetophilidae), Elveden (Center Parcs), Suffolk (TL8080), 21.ix; *Brachypeza armata* Winnertz (Mycetophilidae), Waltham Place, White Waltham, Berks (SU8577), 16.ix.; *Chrysopilus laetus* Zett. (Rhagionidae), Highnam Wood RSPB reserve, Gloucs (SO7720), 24.vii; *Zabrachia tenella* (Jaennicke) (Stratiomyidae), Hines Pit, Stokeford Heath, Dorset (SY8888), reared form pine bark, v; *Tachydromia smithi* Chvála (Hybotidae), Edwinstowe (Center Parcs), Notts (SK6263), 12.vii; *Dolichopus virgultorum* Hal. (Dolichopodidae), Waltham Place, White Waltham, Berks (SU8577), 8.vii; *Medetera pinicola* Kowarz (Dolichopodidae), Hines Pit, Stokeford Heath, Dorset (SY8888), reared form pine bark, v; *Systenus tener* Loew (Dolichopodidae), Waltham Place, White Waltham, Berks (SU8577), reared from rot-hole in apple tree, vi; *Xanthochlorus silaceus* Chandler & Negrobov (Dolichopodidae), Waltham Place, White Waltham, Berks (SU8577), 8.vii; *Seri obscuripennis* (Oldenberg) (Platypezidae), Waltham Place, White Waltham, Berks (SU8577), 16.ix; *Dasydorylas horridus* (Becker) (Pipunculidae), Wentlooge Levels, Glamorgan (ST2479), 11.viii; *Eudorylas montium* (Becker) (Pipunculidae), Hengrove Park, Bristol (ST5968), 21.viii; *Lonchaea collini* Hackman (Lonchaeidae), Hines Pit, Stokeford Heath, Dorset (SY8888), 31.v; *Campiglossa malaris* (Séguy) (Tephritidae), Hengrove Park, Bristol (ST5968), 30.vi; *Tephritis matricariae* (Loew) (Tephritidae), Elveden (Center Parcs), Suffolk (TL7980 & 8080), 20 & 21.ix; *Colobaea distincta* (Meig.) (Sciomyzidae), Wentlooge Levels, Glam. (ST2479), 15.viii; *Clusiodes caledonicus* (Collin) (Clusiidae), Longleat (Center Parcs), Wilts (ST8342), 16.vii;

Anthomyza anderssoni Roháček (Anthomyzidae), ? first verified British record, Blyth, Northumberland (NZ2983), 10.vii & 9.viii.2007, Hengrove Park, Bristol (ST5968), 21.viii; *Hirtodrosophila trivittata* (Strobl) (Drosophilidae), second, third and fourth British records, Longleat (Center Parcs), Wilts (ST8242), 30.viii; Waltham Place, White Waltham, Berks (SU8577), 16.ix (Plate 3, Fig. 4) Elveden (Center Parcs), Suffolk (TL7980), 20.ix; *Amiota collini* Beuk & Máca (Drosophilidae), third British record, Highnam Wood RSPB reserve, Gloucs (SO7820), 24.vii; *Blaesoxipha plumicornis* (Zett.) (Sarcophagidae), Longleat (Center Parcs), Wilts (ST8342), 16.vii.

Halstead, A. J. – (1) A display of photographs of a house leek (*Sempervivum tectorum*) damaged by larvae of the Sempervivum leaf miner, *Cheilosia caerulescens* (Meig.), together with a pinned male and female adult fly, with larvae and puparia in alcohol. This leaf-mining hoverfly was discovered breeding in Britain for the first time in the exhibitor's garden at Knaphill, Surrey (SU964587) in June 2008. The adult flies were reared from larvae in the mined leaves and emerged 28.viii.2008 (♀) and 1.ix.2008 (♂). *Cheilosia caerulescens* is a central European species that has spread further north and westwards in recent years, reaching Holland in 1986. It probably came to Britain with *Sempervivum* plants imported from Holland for sale through garden centres. It is likely to become a destructive pest in gardens of *Sempervivum tectorum*, *S. arachnoideum*, *S. montanum* and other *Sempervivum* species. The outer leaves of the rosettes become discoloured and collapse, giving the impression that the plants are rotting off as a result of over-watering. There are two generations during the summer, with larvae feeding during June and August-September. It is possible that the adult flies exhibited emerged later in the breeding containers than they would have done under natural conditions.

(2) Some local or uncommon Diptera recorded in 2008: *Laphria flava* (L.) (Asilidae) ♂♀ on cut pine trunks, Inshriach Forest, Easterness (NH840018), 4.vii; *Scenopinus fenestralis* (L.) (Scenopinidae), on window pane, RHS Garden Hyde Hall, near Rettenden, Essex (TQ781995), 23.vii; *Chamaesyrphus scaevoides* (Fall.) (Syrphidae), ♀ swept at Rothiemurchus Estate, Easterness (NH9209), 30.vi; *Dacus oleae* (Gmelin) (Tephritidae), ♂♀ reared from olive fruits grown in France, emerged 24.x; *Merzomyia westermanni* (Meig.) (Tephritidae), ♂♀ swept at RHS Garden Hyde Hall, near Rettenden, Essex (TQ781996), 23.vii; *Tephritis divisa* Rond. (Tephritidae), ♂♀ swept at RHS Garden Hyde Hall, near Rettenden, Essex (TQ781996), 23.vii; *Tephritis matricariae* (Loew) (Tephritidae), ♀ swept at Pyrford Common, Surrey (TQ031589) and ♂ RHS Garden Hyde Hall, near Rettenden, Essex (TQ781996), 7.v; *Loxocera sylvatica* Meig. (Psilidae), ♂ Rothiemurchus Estate, Easterness, 30.vi and ♀ Abernethy Forest, Easterness (NH999167). 30.vi; *Phytomyza gymnostoma* (Loew) (Agromyzidae), ♀ reared from leek plants grown at Sutton Coldfield, Warks (SP088954), emerged 4.iv; *Conisternum decipiens* Hal. (Scathophagidae), ♀ swept in saltmarsh at Theddlethorpe Dunes, Lincs (TF471920), 11.v.

Hawkins, R. D. – A male of *Chrysopilus laetus* Zetterstedt (Rhagionidae), found on elder *Sambucus nigra* leaves beside a rotten log in a shady corner of Sunbury Park, Sunbury, Middlesex (TQ108688, VC 23), 4.vii.2008.

Parker, M. J. – Diptera encountered during 2007 and 2008, including rare species and new county records, from Dorset (VC 9), South Wiltshire (VC 6), Cardiganshire (VC 46), Morayshire (VC 9), Wester Ross (VC 105), Easterness (VC 96) and the Outer Hebrides: *Ibisia marginata* (Fabr.) (Athericidae), ♀ swept from riverside vegetation adjacent to boulders in mid-stream, Cwmrheidol, Cardiganshire (SN728781), 19.vii.2007; *Thereva valida* (Loew) (Therevidae), ♂ swept from a woodland clearing at Auchernack, Moray (NJ024249), 29.vi.2008; *Laphria flava* (L.) (Asilidae), ♂ basking on a pine log, Inshriach Forest, Easterness (NH840019),

4.vii.2008; *Callicera aurata* (Rossi) (Syrphidae), dwarf ♂ hovering adjacent to *Euonymus europaeus* flowers on Little Minterne Hill Dorset (ST6604), 7.vi.2008; *Cheilosia mutabilis* (Fall.) (Syrphidae), ♂ swept from a woodland glade in Rothiemurchus Forest Easterness (NH9108), 1.vii.2008; *Myolepta dubia* (Fabr.) (Syrphidae), ♂ at umbel flowers, Stockwood, Dorset (ST586068), 10.vi.2007; *Neocnemodon pubescens* (Delucchi & Pschorn-Walcher) (Syrphidae), ♂ from Chase Woods, Cranbourne Chase, South Wiltshire (ST9719), 8.v.2008; *Volucella inanis* (L.) (Syrphidae), ♂, one of several on *Rubus fruticosus* at Wyke Regis, Weymouth, Dorset (SY664783), 16.vii.2008 – this species has recently increased in numbers in Dorset, and it is now present at several sites from which it was previously absent; *Xylota xanthocnema* (Collin) (Syrphidae), ♀ at Ynys-Hir RSPB Reserve, Cardiganshire (SN683967), 14.vii.2007; *Acinia corniculata* (Zett.) (Tephritidae), ♀ swept from a grazing paddock within Oak Woodland at Oakers Wood, Dorset (SY809913), 22.vii.2007, first Dorset record; *Campiglossa malaris* (Séguy) (Tephritidae), swept from coastal slopes at Wyke Regis, Weymouth, Dorset (SY670767), 26.vi.2008, another species that has recently appeared in Dorset, which is quite an extension to its known range, with most British records confined to south east England; *Goniglossum wiedemanni* (Meig.) (Tephritidae), in numbers on *Bryonia cretica* at Waterston Ridge Dorset (SY713943), 11.vii.2007, first Dorset record; *Noeeta pupillata* (Fall.) (Tephritidae), a pair swept from an embankment at Dovey Junction, Cardiganshire (SN696972), 14.vii.2007; *Tephritis divisa* (Rond.) (Tephritidae), ♀ swept from coastal slopes at Wyke Regis, Weymouth, Dorset (SY670767), 26.vi.2008, recorded from Dorset for the first time this year and subsequently recorded on many coastal sites as far west as the West Bexington area (SY523869); *Trypeta artemisiae* (F.) (Tephritidae), ♀ swept from Machair, Near Gearraidh Ma Monadh, South Uist (NF738167), Outer Hebrides, VC 110, 8.viii.2007, first record for the Outer Hebrides; *T. immaculata* (Macq.) (Tephritidae), ♀ swept from meadowland near Loch Maree, Wester Ross (NG917704), 19.vi.2007.

PERRY, I. – A selection of uncommon Diptera found during 2008: *Symplecta meigeni* (Zett.) (Limoniidae), R. Spey, Aviemore, Inverness-shire, 3.vi, restricted to a short stretch of riverbank with fringing *Carex* and *Equisetum*, seemingly absent from similar areas that lacked the *Equisetum*; *Chrysopilus laetus* Zett. (Rhagionidae), Lode, Cambs, emerged 25.v. from larva found under bark of a well-rotted black poplar *Populus nigra*; *Villa cingulata* (Meig.) (Bombyliidae), Aston Rowant NNR, Oxfordshire, 26.vii, on flowers of parsnip *Pastinaca sativa* – the site is close to Wormsley Park, Bucks, where it was recorded in 1895 and subsequent years, only to apparently disappear from the Chilterns for nearly a century; *Syntormon mikii* Strobl (Dolichopodidae), Windmill Farm, Lizard, Cornwall, 8.vii, swept from sallow carr; *Dorylomorpha clavifemora* Coe (Pipunculiidae), Market Weston Fen, Suffolk, 24.vi, ♀ swept from herb-rich fen; *Pteromicra leucopeza* (Meig.) (Sciomyzidae), Chippenham Fen, Cambs, 30.vii, from a dried-up pool beneath alder *Alnus glutinosa* carr; *Norellia spinipes* (Meig.) (Scathophagidae), Lode, Cambs, 20.vi, in the exhibitor's garden where the foodplant daffodils *Narcissus* spp. are numerous; *Blaesoxipha erythrura* (Meig.) (Sarcophagidae) Hackhurst Down, Surrey, 28.vi; *Clemelis pullata* (Meig.) (Tachinidae), Ranmore, Surrey, 10.viii, on parsnip *Pastinaca sativa* flowers; *Cylindromyia brassicaria* (Fabr.) (Tachinidae), Eastern Cliff, Lizard, Cornwall, 11.vii, ♂ at a yellow composite – there is a long history of recording this species at the Lizard, over more than a century (Plate 3, Fig. 5); *Opesia grandis* (Egger) (Tachinidae), Lode, Cambs, 23.vii, in the exhibitor's garden ♂ on cultivated *Eryngium* flowers and 6.viii, ♀ at *Solidago canadensis* flowers – still known in Britain

only from two sites in SE Cambs; *Fausta nemorum* (Meig.) (Tachinidae), White Downs, Surrey, 10.viii, a pair on parsnip *Pastinaca sativa* flowers.

COLEOPTERA

ALEXANDER, K. N. A.–A selection of rare wood decay beetles from three historic parkland sites across England. (1) Dunham Park, Cheshire, SJ7487. *Aeletes atomarius* (Aubé) (Histeridae), one in flight trap operated inside hollow beech tree, vi & vii.2008, new to site list. *Megatoma undata* (L.) (Dermestidae), on exposed heartwood of ancient oak, 22.v.2008, first record here in over 100 years. *Pediacus depressus* (Herbst) (Cucujidae), adult and larvae beneath tight bark on recently collapsed top of old oak tree, 30.vii.2008, first record here in over 100 years. *Hallomenus binotatus* (Quensel) (Melandryidae), abundant on Chicken-of-the-Woods fungus *Laetiporus sulphureus* on old oak, 23.vi.2008, first record here in over 100 years. *Abdera biflexuosa* (Curtis) (Melandryidae), knocked from aerial dead boughs on open-grown oaks, 23.vi.2008, new to site list. *Abdera quadrifasciata* (Curtis) (Melandryidae), knocked from aerial dead bough on open-grown oak, 30.vii.2008, first record here in over 100 years. *Melandrya caraboides* (L.) (Melandryidae), two under loose bark on old felled beech trunk section, 21.v.2008, first record here in over 100 years. *Conopalpus testaceus* (Olivier) (Melandryidae), aerial dead branches of open-grown oaks, 23 & 24.vi.2008. *Pseudocistela ceramboides* (L.) (Tenebrionidae), adult in flight trap operated on old beech snag, vi & vii.2008, and larvae in wood mould in old oaks, new to site list. *Phymatodes testaceus* (L.) (Cerambycidae), adult under bark of fallen oak bough, 25.vi.2008 and larval galleries more widespread, new to site list. (2) Lanhydrock Park, East Cornwall, SX0863, all from flight trapping. *Microscydmus nanus* (Schaum) (Scydmaenidae), from collapsed sycamore, viii. & ix.2008, new to Cornwall. *Prionocyphon serricornis* (Müller) (Scirtidae), from old oak, viii & ix.2008. *Epiphanus cornutus* Eschscholtz (Eucnemidae), from old oak, viii & ix.2008, new to Cornwall. *Mycetophagus piceus* (Fabr.) (Mycetophagidae), from old oak, vi & vii.2008, first Cornish record in over 100 years. *Mordellistena neuwaldeggiana* (Panzer) (Mordellidae), from old oak, viii & ix.2008, new to Cornwall. (3) Belton Park, Lincolnshire, SK9338. *Diplocoelus fagi* (Chevrolat in Guérin-Méneville) (Biphyllidae), one knocked from bracket fungus *Polyporus squamosus* on horse chestnut, 28.vii.2008, apparently new to the county. *Silvanus bidentatus* (Fabr.) (Silvanidae), small numbers under bark on freshly fallen and felled oak trunks, 29.vii.2008 and 15.ix.2008, apparently new to the county. *Uleiota planata* (L.) (Silvanidae), adults and larvae under oak bark, 16.ix.2008 and subsequently, apparently new to the county. *Cicones undatus* Guérin-Méneville (Colydiidae), aerial dead branch on open-grown oak, 15.ix.2008, apparently new to the county. *Scraptia testacea* Allen (Scraptiidae), in flight trap operated inside ancient oak, vi & vii.2008, apparently new to the county.

ALLEN, A. J. – *Leistus montanus* Stephens (Carabidae), Langdale Fell, Cumbria, NY8707, a single specimen found by turning over stones on a scree slope, 12.x.2008. *Bembidion bipunctatum* (L.) (Carabidae), Loch Venachar, West Perth, NN5606, several in shingle well above the edge of the loch, 28.vi.2008, a persistent population as found at more or less exactly the same location as found by R.G. Booth almost exactly 25 years previously. *Trechus fulvus* Dejean (Carabidae), Bossington, Somerset, SS8948, one in litter at the back of the beach, 25.x.2008. *Pterostichus aethiops* (Panzer) (Carabidae), Near Tarr Steps, Somerset, SS8732, under moss covered bark of fallen dead tree, 17.x.2008. *Cymindis axillaris* Fabr. (Carabidae), Shepherd's Port, West Norfolk, TF6431, a single example in coastal litter, 5.ii.2008.

Cafius fucicola Curtis (Staphylinidae), Brean, Somerset, ST2958, several in heaps of rotting seaweed, 14.ix.2008. *Stenus guynemeri* Jacquelin du Val (Staphylinidae), Barle Valley, Somerset, SS8532, two found in moss growing on stones in a small stream, 17.x.2008. *Berginus tamarisci* Wollaston (Mycetophagidae), Brooklands, Surrey, SU0662, two specimens found with Roger Booth on black pines, 11.xi.2007, a species new to Britain. *Myrmechixenus vaporariorum* Guérin-Méneville (Tenebrionidae), Gussage All Saints, Dorset, ST9910, one example found in compacted straw/hay on the floor of a barn, 18.ix.2008, no other Dorset records found. *Aglenus brunneus* (Gyllenhal) (Salpingidae), Gussage All Saints, Dorset, ST9910, several specimens found in compacted straw/hay on the floor of a barn, 18.ix.2008, no other Dorset records known. *Cassida sanguinosa* Suffrian (Chrysomelidae), Preston, Devon, on tansy growing at the back of a bar of river shingle, 6.vii.2007. *Byctiscus betulae* (L.) (Rhynchitidae), Botley Wood, Hampshire, SU5310, a single example found by beating hazel, 30 May 2008. *Pseudoprotapion astragali* (Paykull) (Apionidae), near Didcot, Oxfordshire, plentiful on liquorice, 5.vi.2008. *Sitona puberulus* (Reitter) (Curculionidae), Lamberhurst, Kent, TQ63, several found on *Lotus*, 23.ix.2008. *Brachyderes incanus* (L.) (Curculionidae), Windsor, Berkshire, SU9575, one specimen on hawthorn blossom, 12.v.2008, the first time that I have found this new arrival away from Brooklands. *Pentarthrum huttoni* Wollaston (Curculionidae), Gussage All Saints, Dorset, ST9910, found in compacted straw/hay on the floor of a barn, 18.ix.2008, this species has been found in reasonable numbers for a few years and Dave Boyce tells me that he has found it in similar situations. *Smicronyx reichi* (Gyllenhal) (Curculionidae), Ballard Down, Dorset, SZ0461, on centaury, 7.vi.2008. *Sibinia pyrrhodactyla* (Marsham) (Curculionidae), Kingsley, Surrey, several by searching on and under corn spurrey, 5.vi.2008.

ASHBY, M.–*Harpalus griseus* (Panzer) (Carabidae), near Thetford, West Norfolk, several taken in pitfall traps set in broad grassy field margins, August and September 2008, the first time this species has been recorded in numbers in Britain (Plate 3, Fig. 9). *Ophonus laticollis* Mannerheim (Carabidae), near Thetford, West Norfolk, taken in pitfall traps set in broad grassy field margins, August and September 2008. *Sinoxylon sexdentatum* (Olivier) (Bostrichidae), London, Middlesex, TQ312896, one specimen, believed to be this species but awaiting confirmation, taken at mv light, 25.vii.2006, apparently a new British record. *Hippodamia convergens* (Guérin-Méneville) (Coccinellidae), found on kitchen window, possibly from a bunch of fresh coriander purchased at a local shop but of Californian origin, July 2001, possibly a new British record. *Deilus fugax* (Olivier) (Cerambycidae), Ashford, East Kent, TR012416, taken from area of scrub, 20.v.2008, apparently new to Britain, the area was searched extensively during the subsequent months but no more examples were found (Plate 3, Fig. 6).

BARCLAY, M. V. L. – *Mesocoelopus collaris* Mulsant & Rey (Anobiidae), Fulham, Middlesex, widespread on ivy in the area, 2006 and subsequently, a southern European, ivy-feeding species new to Britain, first noted by Jonty Denton and shortly afterwards by Maxwell Barclay, identified first by Maxwell Barclay and confirmed by Petr Zahradnik.

BOYD, G. – *Pterostichus longicollis* (Duftschmid) (Carabidae), Titchmarsh L. N. R., Northamptonshire, TL0080, under logs and stones on this wetland reserve in the Nene Valley, 17.v.2006. *Megatoma undata* (L.) (Dermestidae) and *Necrobia violacea* (L.) (Cleridae), Twywell Hills and Dales Reserve, Northamptonshire, SP9477, on the desiccated remains of a muntjac deer lying on the edge of a steep wooded slope. *Variimorda villosa* (Schrank) (Mordellidae), Sane Copse, Yardley Hastings,

Northamptonshire, SP8554, one specimen, probably this species, swept off St. Johns-wort in an open ride through damp deciduous woodland, 14.vi.2008. *Podagrica fuscicornis* (L.) (Chrysomelidae), Northampton, Northamptonshire, SP 7762, in some numbers on hollyhock in garden, 1.vii.2008 and subsequently until 17.viii.2008, apparently a new county record *Aspidapion radiolus* (Marsham) (Apionidae), Northampton, Northamptonshire, SP 7762, on hollyhock in garden, 17.vii.2008. *Malvapion malvae* (Fabr.) (Apionidae), Northampton, Northamptonshire, SP7762, on hollyhock in garden, 25.vii.2008. *Cionus tuberculosus* (Scopoli) (Curculionidae), Harlestone, Northamptonshire, SP7164, swept of figwort, north-west sector of Harlstone Firs, 5.vii.2008.

DICKSON, R. – *Odonteus armiger* (Scopoli) (Bolboceratidae), Hen Wood, South Hampshire, SU6522, a rather undersized and underdeveloped example taken at mv light on chalk area away from the nature reserve, 8.viii.2008, the second year running that the local moth group has recorded this species. *Geotrupes stercorarius* (L.) (Geotrupidae), Hyden Wood area, South Hampshire, SU6818, at least 350 dead or dying beetles counted by Kevin Coker and Andrew Sherwood along 50 yards of rural road, 24.ix.2008, the beetles did not appear to be road casualties and the stretch of road was not adjacent to areas of grazing by large herbivores. *Melasis buprestoides* (L.) (Eucnemidae), Titchfield Haven NNR, South Hampshire, SU5302, male in Malaise trap, 13-14.v.2008, a surprising capture perhaps for an estuarine reserve, but there was a heap of cut branches nearby and other dead wood species were also found. *Silis ruficollis* (Fabr.) (Cantharidae), Titchfield Haven NNR, South Hampshire, SU5302, sixteen examples in Malaise trap, 8-9.vi.2008 and 10-11.vi.2008, many more examples that previously seen. *Holotrichapion ononis* (Kirby) (Apionidae), Eype Mouth, Dorset, SY4491, on *Ononis*, 22.viii.2008. *Cyanapion afer* (Gyllenhal) and *Oxystoma subulatum* (Kirby) (Apionidae), 1 km N. Tilshead, North Wiltshire, SU0348, sweeping meadow vetchling *Lathyrus pratensis* growing along an agricultural track, 29.viii.2008. *Hemitrichapion reflexum* (Gyllenhal) (Apionidae), Bulford Field, South Wiltshire, SU1845, swept from vegetation including sainfoin *Onobrychus viciifolia*, 29.viii.2008.

HALSTEAD, A. J. – *Diaperus boleti* (L.) (Tenebrionidae), Littlewick Common, near Woking, Surrey, SU975595, in birch polypore fungus, 24.viii.2008. *Anastrangalia sanguinolenta* (L.) (Cerambycidae), Glenmore Lodge, near Aviemore, Elgin, NH988095, on a pine stump, 3.vii.2008. *Orsodacne cerasi* (L.) (Chrysomelidae), near Speybridge, Elgin, NJ033266, swept in wood, 29.vi.2008. *Cryptocephalus sexpunctatus* (L.) (Chrysomelidae), near Speybridge, Elgin, NJ033266, on aspen trunk in wood, 29.vi.2008. *Anthribus fasciatus* Forster (Anthribidae), RHS Garden Hyde Hall, near Rettendon, Essex, TQ781997, swept from old oak tree, 7.v.2008.

HENDERSON, M. – *Variimorda villosa* (Schrank) (Mordellidae), River Itchen between Kiln Lane and Shawford, Hampshire, feeding on ragwort on river bank, 19.vii.2008. *Paracorymbia fulva* (De Geer) (Cerambycidae), River Itchen between Kiln Lane and Shawford, Hampshire, several seen on umbellifers on river bank, 19.vii.2008. *Pseudovadonia livida* (Fabr.) (Cerambycidae), Farthing Down, South Coulton, Surrey, on bramble, 15.vi.2008. *Stenurella melanura* (L.) (Cerambycidae), Bursden Moor, North Devon, on thistle, 4.vi.1997. *Chrysolina herbacea* (Duftschmid) (Chrysomelidae), Bookham Common, Surrey, on water mint at edge of Isle of Wight pond, 9.viii.2008.

HODGE, P. J. – Eight species of Coleoptera collected during summer 2008, including two jewel beetles (Buprestidae) and a weevil (Apionidae) new to Britain from the same site in east London. *Ophonus azureus* (Fabr.) (Carabidae), Beckton, South Essex, TQ438815, TQ439818 and TQ439819, three black examples of this

normally metallic green species swept off wild carrot *Daucus carota* flowers, 8.vi.2008, a typical female from Sandown, Isle of Wight, exhibited for comparison. *Agrilus cuprescens* (Ménétriés) (Buprestidae), Beckton, South Essex, TQ43988167, netted off bramble leaves *Rubus fruticosus* agg., 8.vi.2008, the first British record (Plate 3, Fig. 7). *Agrilus cyanescens* Ratzeburg (Buprestidae), Beckton, South Essex, TQ43848143, male netted off sallow foliage by Mike Edwards, 8.vi.2008, the first British record (Plate 3, Fig 8). *Agrilus viridis* (L.) (Buprestidae), Beckton, South Essex, TQ44498090, male and female swept off sallow foliage on the bank of the River Thames, 8.vi.2008. *Scymnus limbatus* Stephens (Coccinellidae), Church Path Pit, Gravesend, West Kent, TQ62257395, one swept in disused chalk quarry (NB: this site is private and has no public access). *Pseudoperapion brevirostre* (Herbst) (Apionidae), Beckton, South Essex, TQ43988167, swept off perforate St John's-wort *Hypericum perforatum*, 8.vi.2008, the first British record. *Otiorhynchus dieckmanni* Magnani (formerly identified in UK as *O. setosulus* Stierlin which is not therefore a British species) (Curculionidae), Church Path Pit, West Kent, Gravesend, TQ623739, one beaten off *Buddleja* in disused chalk quarry, 21.v.2008. *Tychius breviusculus* Desbrochers (Curculionidae), Beckton, South Essex, TQ44528094, swept off white melilot *Melilotus alba* growing along bank of River Thames, 14.vii.2008.

JONES, R. A. – *Larinus turbinatus* Gyllenhal (Curculionidae), Tripcock Point, near Thamesmead, West Kent, a single specimen found in company with *Larinus planus* (Fabr.), 16.vi.2008, a new British record.

MORRIS, M. G. – A selection of ceutorhynchine weevils (Curculionidae: Ceutorhynchinae) captured recently in Europe and the Canary Islands, illustrating diversity in the group. *Ceutorhynchus duvali* Ch. Brisout, Cotignac, Var, France, 20.iv.2006, on *Bunias erucago*. *Ceutorhynchus* is a very speciose genus; all the species are associated with Brassicaceae (or Resedaceae), many specific to one plant species or genus. *Ceutorhynchus fulvipes* Schultze, Torres de Cerca & Foia, Algarve, Portugal, 18. & 19.iv.2007, on Brassicaceae spp. *Ceutorhynchus hampei* Ch. Brisout, Nr. Sapreva, Sofia Province & Nr. Simitli, Blagoevgrad Province, Bulgaria, 13.vi.2006 & 13.vii.2005, on *Berteroa incana*. *Ceutorhynchus leprieuri* Ch. Brisout, Montfort-s-Argens, Var, France, 17.iv.2006, on mixed Brassicaceae. One of several 'blue' species which are difficult to identify. *Ceutorhynchus napi* Gyllenhal, Ponteves, Var, France, 20.iv.2006, on young plants of *Isatis tinctoria*, co-occurring with *Aulacobaris fallax* (H. Brisout) (Baridinae), which is monophagous on that plant. *Ceutorhynchus pervicax* Weise, Nr. Samokov, Sophia Province, Bulgaria, 11vi.2006, on Brassicaceae spp. Like many uncommon British species this one appears to be more frequent in continental Europe. *Ceutorhynchus picitarsis* (Gyllenhal), Nr. Obrociste, Varna Province, Bulgaria, 28.v.2007, 'swept'; the hosts are various Brassicaceae spp. Even more so than the last species this is very common on the Continent. *Ceutorhynchus roberti* Gyllenhal, Nr. Radog, Blagoevgrad Province, Bulgaria, 16.vii.2005, on *Alliaria petiolata*. This species is distinct, but closely allied to *C. alliariae* H. Brisout, with which it has been confused, especially in older British literature. *Ceutorhynchus rusticus* Gyllenhal, Le Mônetier-les-Bains & Châteauroux, Hautes-Alpes, France, 28 & 30.v.2005, on *Isatis tinctoria*. The largest common *Ceutorhynchus* species. *Ceutorhynchus syrites* Germar, Nr. Briançon, Hautes-Alpes, France, 30.v.2005, ?on *Alyssum* sp. This species is almost certainly extinct in Britain. *Datonychus arquatus* (Herbst), Notre Dame des Landes, Loire-Atlantique, France, 14.viii.2003, on *Lycopus europaeus*, the usual host, growing in shady conditions (as in the Welsh locality). A very uncommon species in the British Isles. *Datonychus urticae* (Boheman), Nr. Tsarkva, Varna Province, Bulgaria, 17.vi.2006, on *Stachys* sp. Like *D. arquatus* this is a rare British species, and seems to

have declined appreciably in the last fifty years or so. *Ectamnogaster caviventris* (Schultze), Nr. Aljezar & Nr. Bensafrim, Algarve, Portugal, 28 & 29.iv.2004, on *Galactites tomentosa*. This species is superficially very similar to the common *Hadroplontus trimaculatus* (Fabr.). *Ethelcus denticulatus* (Schrank), Nr. Balcik, Varna Province, Bulgaria, 24 & 26.v.2007, on *Papaver rhoeas*. This species is associated with many species of Papaveraceae, unlike the uncommon British congener *E. verrucatus* (Gyllenhal). *Hesperorhynchus hesperus* (Wollaston), Mirador de El Rejo, La Gomera, Canary Is., 30.vi.2008, on a species of Crassulaceae. The genus is peculiar to Macaronesia; the species are flightless, a not uncommon phenomenon in island faunas. *Microplontus molitor* (Gyllenhal), Nr. Brunheiras & Ourique, Alentejo, Portugal, 21.iv.2007, on *Chrysanthemum myconis*. A very common species in this province and the Algarve. *Mogulones abbreviatulus* (Fabr.), Obrociste, Varna Province, Bulgaria, 7 & 9.vi.2008, on *Symphytum* sp. One of the largest species of *Mogulones*, a very speciose genus whose members are all associated with Boraginaceae. *Mogulones andreae* (Germar), Porto de Lagos, Algarve, Portugal, 18.iv.2007, on *Cynoglossum ?officinale*. One of several black-and-white species which can be difficult to identify. Apparently it is normally found on *Cerinthe minor*. *Mogulones austriacus* (Ch. Brisout), Nr. Tsarkva, Varna Province, Bulgaria, 7 & 15.vi.2006, on *Symphytum* & *Anchusa* spp. (?). *Mogulones beckeri* (Schultze), Nr. Lagou, Lasithi, Crete, 28.v.2006, on *Echium italicum*; a weevil rather similar to the common European and British *M. geographicus* (Goeze). *Mogulones euphorbiae* (Ch. Brisout), Nr. Samokov, Sofia Province, Bulgaria, 9.vi.2006, on *Myosotis* sp. An uncommon British species. *Mogulones raphani* (Fabr.), Obrociste, Varna Province, Bulgaria, 7.vi.2008, on *Symphytum* sp., occurring with *M. abbreviatulus*. *Neoglocianus albovittatus* (Germar), Nr. Kararna & Tsarkva, Varna Province, Bulgaria, 25 & 27.v.2007, on *Papaver rhoeas*. An attractive striped weevil, one of several poppy-feeding species which do not occur in the British Isles. *Neoglocianus maculaalba* (Herbst), Moustiers-Sainte-Marie, Alpes-de-Haute-Provence, France, 1.vi.2005, on *Papaver rhoeas*. Commoner in western Europe compared with *N. albovittatus*, which is more frequent in the east. *Ranunculiphilus faeculentus* (Gyllenhal), Kranevo, Varna Province, Bulgaria, 7.vi.2008, on *Consolida* sp. The commonest species in this genus, which is associated, unusually, with Ranunculaceae (as the name implies). *Sirocalodes nigroterminatus* (Wollaston), Las Hayas, La Gomera, Canary Is. 29.vi.2008, swept (hosts are *Fumaria* spp.). A species closely allied to the British *S. mixtus* (Mulsant & Rey). *Sirocalodes quercicola* (Paykull), Dolna Banja, Sophia Province, Bulgaria, 12.vi.2006, on *Fumaria* sp. An uncommon British species. According to Colonnelli's *Catalogue of Ceutorhynchinae of the World* (2004) it has not previously been recorded from Bulgaria. *Stenocarus cardui* (Herbst), Nr. Kavarna & Konare, Varna Province, Bulgaria, 25 & 26.v.2007, on *Papaver rhoeas*. A species which does not occur in the British Isles but which has been confused with *S. ruficornis* (Stephens). *Thamiocolus pubicollis* (Gyllenhal), Rimetea, Alba Province, Romania, 21.vii.2008, on *Betonica officinalis*. A very pretty little weevil, species of *Thamiocolus* are all associated with Lamiaceae. *Thamiocolus wollastoni* (Uyttenboogaart), Nr. Eretos, La Gomera, Canary Is., 30.iv. & 1.v.2008, on *Sideritis* sp. A species which eluded that indefatigable coleopterist T. Vernon Wollaston. *Trichosirocalus horridus* (Panzer), Nr. Vinitsa & Tsarkva, Varna Province, Bulgaria, 6.vi.2006 & 24.v.2007, on *Onopordum* & *Echinops* spp. A British species which often seems to be uncertain in its appearance. *Trichosirocalus urens* (Gyllenhal), Nr. Mohos, Lasithi, Crete & Nr. Budens, Algarve, Portugal, 29.v.2006 & 22.iv.2007, by general collecting (hosts are various 'thistles'). *Zacladus asperatus* (Gyllenhal), Nr. Albena, Varna Province, Bulgaria, 25.v.2007, on *Erodium* sp. Very similar to the

British *Z. geranii* (Paykull), but with erect elytral setae and feeding on a different genus of Geraniaceae (*Erodium* rather than *Geranium*).

PARKER, M. – Some Cerambycidae encountered during 2008 from Dorset and Easterness. *Pseudovadonia livida* (Fabr.) (Cerambycidae), Hambledon Hill, Dorset, ST844123, one swept from chalk grassland, 16.vi.2008. *Molorchus minor* (L.) (Cerambycidae), Monks Arundell Coppice, Cranbourne Chase, Dorset, ST968182, several swept from *Crataegus monogyna* blossom, 24.v.2008. *Obrium brunneum* (Fabr.) (Cerambycidae), Great Shaftesbury Coppice, Cranbourne Chase, Dorset, ST976193, several swept from *Conopodium majus*, 8.vi.2008. *Asemum striatum* (L.) (Cerambycidae), Monks Arundell Coppice, Cranbourne Chase, Dorset, ST968182, one caught on a conifer log, 24.v.2008. *Paracorymbia fulva* (De Geer) (Cerambycidae), Manswood Farm, Dorset, ST97740795, one caught on a log, part of a ring of logs used to border a raised flower bed, 23.vii.2008. *Judolia sexmaculata* (L.) (Cerambycidae), Glenmore Lodge, Easterness, NH986095, one caught on a pine stump, 3.vii.2008.

TELFER, M. G. – (1) Notable species from Ireland including additions to Irish lists. *Stenichnus poweri* (Fowler) (Scydmaenidae), Ballymacormick Point Area of Special Scientific Interest (ASSI), County Down, J5283, a single male under driftwood, 21.v.2007, Port Noffer, Giant's Causeway and Dunseverick ASSI, County Antrim, C9544, a male and female, 1.ix.2007, and Port Granny, Giant's Causeway and Dunseverick ASSI, County Antrim, C9444, a male and female, 2.ix.2007, new to Northern Ireland. *Bledius spectabilis* Kraatz (Staphylinidae), Downshire Bridge to the mouth of the estuary at Murlough ASSI, County Down, J4035, a population estimated at between 100,000 and 1,000,000 individuals along the shore, 19.vi.2007, new to the Irish list. *Stenus kiesenwetteri* Rosenhauer (Staphylinidae), Glengarriff Woods, West Cork, V920568, a dead adult in a clearing with flushes, 6.vi.2008, the second Irish locality. *Schistoglossa curtipennis* (Sharp) or *S. bergvalli* Palm (Staphylinidae), Port Noffer, Giant's Causeway and Dunseverick ASSI, County Antrim, C949446, a single female by sieving, 25.vi.2007, neither species has been known previously from Ireland. *Aloconota planifrons* Waterhouse (Staphylinidae), Benderg Bay, Killard ASSI, County Down, J6043, a single male, 24.iv.2007, determined by Derek Lott and new to Northern Ireland. *Brundinia marina* (Mulsant & Rey) (Staphylinidae), Ann's Point, Strangford Lough Part 1 ASSI, County Down, J557685, a single male on the margins of the brackish lagoon, 22.v.2007, determined by Derek Lott and new to Northern Ireland. *Halobrecta algophila* (Fenyes) (Staphylinidae), Inner Belfast Lough ASSI, County Down, J385783, a single male by hand-searching on the margins of a small, sheltered, tidal lagoon in a shell-sand area near the sewage plant, 17.v.2007, new to the Irish list. *Melolontha hippocastani* Fabr. (Scarabaeidae), Umbra River estuary Magilligan ASSI, County Londonderry, C7336, head and a single elytron of a male amongst freshly deposited tide-line debris on the beach, 15.v.2007. *Bagous frit* (Herbst) (Curculionidae), Burdautien Lough ASSI, County Fermanagh, H494281, a male and female by sieving moss on the shore, 21.vii.2007. *Pelenomus zumpti* (Wagner) (Curculionidae), Roe Estuary, Lough Foyle ASSI, County Londonderry, C644294, a single male, 26.iv.2007 and Ann's Point, Strangford Lough Part 1 ASSI, County Down, J557685, a male and female collected by grubbing around sea-milkwort *Glaux maritima* on the margins of the brackish lagoon, 22.v.2007, the first and second Irish localities, specimens confirmed by M. G. Morris.

(2) Notable species from southern England. *Bembidion octomaculatum* (Goeze) (Carabidae), The Vyne (National Trust), North Hampshire, SU6356, three in wetland, 23.v.2008, the eighth British locality since its rediscovery in 1992 and the

first for Hampshire. *Stichoglossa semirufa* (Erichson) (Staphylinidae), Black Park, Buckinghamshire, TQ007830, a single male from under wet bark of recently fallen beech tree, 20.i.2007, confirmed by P. M. Hammond. *Aleochara binotata* Kraatz (Staphylinidae), Minsmere RSPB Reserve, East Suffolk, TM475669, a male from a pitfall trap set by Graeme Lyons on a saline lagoon margin, 19–26.viii.2003, determined by R. Colin Welch, and Sandy Heath Quarry, Bedfordshire, TL2049, a male and five females from under fox dung, only four British records were reported by Welch, R. C. (1997), *The Coleopterist* **6**, 1–45. *Prionocyphon serricornis* (Müller) (Scirtidae), Basildon Park (National Trust), Berkshire, SU6077, a female beaten off oak, 14.vii.2008. *Procraerus tibialis* (Boisduval & Lacordaire) (Elateridae), Claydon (National Trust), Buckinghamshire, SP7125, a single elytron found in a veteran ash that had fallen down three days earlier, 20.v.2008. *Stictoleptura scutellata* (Fabr.) (Cerambycidae), Basildon Park (National Trust), Berkshire, SU6077, a female captured in flight, 14.vii.2008. *Anthribus fasciatus* Forster and *Anthribus nebulosus* Forster (Anthribidae), Claydon (National Trust), Buckinghamshire, SP7125, both species beaten from the same oak branch, 20.v.2008.

HEMIPTERA

ALEXANDER, K. N. A. – A copy of *The Land and Freshwater Bugs (Hemiptera) of Cornwall and the Isles of Scilly*, recently published by the Cornwall & Isles of Scilly Federation of Biological Recorders and the Environmental Records Centre for Cornwall & the Isles of Scilly.

BIGGS, D. – *Hypseloecus visci* (Puton) (Miridae), Waltham Place, White Waltham, Berkshire (SU8577), 8.vii.2008.

CLANCY, S. – *Leptoglossus occidentalis* (Heidemann) (Coreidae) (Western Conifer-seed Bug), Bird Observatory, Dungeness, Kent, 30.viii.2008, taken at mv light (Plate 3, Fig. 1).

DICKSON, R. – *Leptoglossus occidentalis* (Heidemann) (Coreidae) (Western Conifer-seed Bug), Southsea, S. Hants (VC 11), SU 6700, 5.x.2008, on wall illuminated by mv light, collected by I. Thirlwell; Fareham, S. Hants (VC 11), SU 5707, 12.x.2008, at mv light, collected by K. Wheeler.

HAWKINS, R. D. – *Syromastus rhombeus* (L.) (Coreidae) reared from nymph swept from woodland edge, Sixty Acre Wood, Chessington, Surrey, TQ 166620, 10.viii.2008. In captivity, fed on unripe fruits of *Cochlearia danica* and *Cerastium fontanum*.

HODGE, P. J. — Five species of Hemiptera collected in south-east England during 2008. *Aphanus rolandri* (L.) (Lygaeidae), Dorothy Stringer High School, Brighton, East Sussex, TQ30900725, 17.ix.2008, on sparsely vegetated chalky ground, the second recent record from Brighton for this Nationally Scarce species; *Arocatus roeselii* (Schilling) (Lygaeidae), Battersea Park, Surrey, TQ27547726, 15.ix.2008, crawling on wall near mature plane tree; *Macrotylus horvathi* Wagner (Miridae), Thamesmead, West Kent, TQ45028059, 20.viii.2008, on black horehound *Ballota nigra* growing on south bank of River Thames, the third British locality for this recently established species (Plate 3, Fig. 2); *Orthotylus caprai* Wagner (Miridae), Kingston-upon-Thames, Surrey, TQ62257395, 15.ix.2008, beaten off foliage of mature open grown ?Lawson's cypress in cemetery, the second British site; *Liguropia juniperi* (Lethierry) (Cicadellidae), Kingston-upon-Thames, Surrey, TQ62257395, 15.ix.2008, beaten off foliage of mature open grown ?Lawson's cypress in cemetery.

STEWART, A. J. A. – Six species of Auchenorrhyncha (Hemiptera) recently recorded as new to Britain: *Fieberiella florii* (Stål) (Cicadellidae), Imperial Wharf,

Chelsea, London, TQ 263762; 15.ix..2008; 2 males; swept off ornamental shrubs; first recorded in Britain by Peter Hodge in 1998. *Synophropsis lauri* (Horváth) (Cicadellidae), Chelsea Harbour, London, TQ 263769; 15.ix.2008; 2 males; swept off Bay Laurel, *Laurus nobilis*, first recorded in Britain by Stuart Foster in 2007. *Liguropia juniperi* (Lethierry) (Cicadellidae), Kingston-upon-Thames Cemetery, Surrey, TQ 191686; 15.ix.2008; 1 male, 2 females; swept off Lawson's Cypress, *Chamaecyparis lawsoniana*, first recorded in Britain by Peter Kirby in 2006 (Plate 3, Fig. 3). *Batracomorphus allionii* (Turton) (Cicadellidae), Yew Hill, Hampshire, SU455265; 5.viii.2003; 1 female; suction sampled from rank calcareous grassland, first recorded in Britain by Marcus Oldfield in 2002, specimen of *B. irroratus* (St.Catherine's Hill, Hampshire, 5.viii.2003) exhibited for comparison. *Prokelisia marginata* (Van Duzee) (Delphacidae), Bosham Ferry, West Sussex, TQ 801032; 10.ix.2008; 1 male, 2 females; swept off cord-grass, *Spartina* sp., first recorded in Britain by Mike Wilson in 2008. *Zyginella pulchra* (Löw) (Cicadellidae), Lewes Cemetery, East Sussex, TQ 407098; 7.ii.2008; beaten off yew, *Taxus baccata*, first recorded in Britain by Krisztina Bleicher in 2001.

Wilson, M. R. & Mühlerthaler, R. – *Prokelisia marginata* (van Duzee) (Delphacidae), Fawley, S. Hampshire (VC 11), SU 473034, 5.viii.2008; Hythe, S. Hampshire, (VC 11), SU 435075, 5.viii.2008; Poole Harbour, Dorset, SY9888, (VC 9), 12.viii.2008.

Hymenoptera

Archer, M. – Interesting records of aculeate Hymenoptera from Yorkshire, Essex and Kent during 2007. Chrysididae: *Chrysura radians* (Harris), 5.ix.2007, St Nicholas Field, York, SE6152; *Hedychrum niemelai* Linsenmaier, 27.vii.2007, East Tilbury Silt Lagoon, Essex, TQ6977. Pompilidae: *Anoplius infuscatus* (Vander Linden), 21.vii.2007, Hatfield Moor, South Yorkshire, SE7006. Sphecidae: *Cerceris quadricincta* (Panzer), 4.vii.2007, Pegwell Bay, Kent, TR3564. Halictidae: *Dufourea minuta* Lepeletier, 29.vii.2007, near West Tilbury, Essex, TQ67; *Lasioglossum pauperatum* (Brulle), 28.vi.2007, near West Tilbury, Essex, TQ67. Apidae: *Bombus rupestris* (Fabr.), 27.vii.2007, Allerthorpe Common, East Riding, Yorkshire, SE7645.

Baldock, D. W. – Bees and wasps (Hymenoptera Aculeata) new to Britain since 1977. This exhibit was intended to familiarise recorders with these new species and encourage them to search for them. Where no British specimen was available, a continental specimen was exhibited. Chrysididae: *Chrysis gracillima* (Foerster), first found in East Kent in 1977. Two specimens from Surrey. Pompilidae: *Agenioideus sericeus* (Vander Linden), first found in West Sussex in 2005, pair from Midhurst. *Episyron gallicum* (Tournier), first found in Bedfordshire in 2005, specimen from France. Vespidae: *Dolichovespula media* (Retzius), first found in East Sussex in 1980, pair from Surrey. *Dolichovespula saxonica* (Fabr.), first found in Surrey in 1987, male and queen from Surrey. *Polistes dominulus* (Christ), first found breeding in Surrey in 2003, specimens from continental mainland. Sphecidae: *Crossocerus congener* (Dahlbom), first found in Hertfordshire in 1999, female from Herts. *Crossocerus distinguendus* (Morawitz), first found in East Kent in 1979, pair from Surrey. *Miscophus bicolor* Jurine, first found in Suffolk in 2003, pair from Suffolk. Exhibited alongside specimens of *Miscophus concolor* Dahlbom to show the differences between these two species. *Nitela lucens* Gayubo & Felton, first found in Surrey in 1982, pair from Surrey. *Passaloecus eremita* Kohl, first found in West Sussex in 1978, pair from Surrey. *Stigmus pendulus*. Panzer, first found in Kent in 1986, pair from Surrey. Halictidae: *Lasioglossum sexstrigatum* (Schenck), first found in Surrey in 2008, specimen from continental mainland.. Megachilidae: *Stelis breviuscula*

(Nylander), first found in West Sussex in 1984, pair from Surrey, exhibited alongside its host *Heriades truncorum* (L.) to show the similarities between these two species. Colletidae: *Colletes hederae* Schmidt & Westrich, first found in Dorset in 2001, male from Dorset, female from Surrey. *Xylocopa violacea* (L.), first found breeding in Leicestershire and West Kent in 2006, specimens from continental mainland. *Ceratina cyanea* (Kirby), exhibited alongside to show the size difference between these two Carpenter Bee species. Apidae: *Bombus hypnorum* (L.), first found in Wiltshire in 2001, continental specimens.

Boyd, G. – Hymenoptera collected between 2004 and 2008. Sapygidae: *Monosapyga clavicornis* (L.), 22.v.2004, Dinton Pastures, Hurst, Berkshire, SU7872; *Sapyga quinquepunctata* (Fabr.), 1.vi.2007, Cherry Nook Road, Deighton, South-west Yorkshire, SE1619. Pompilidae: *Anoplius nigerrimus* (Scopoli), Barford Bridge Reserve, Rushton, Northamptonshire, 13.viii.2008, SP8582; *Arachnospila spissa* (Schiodte), 18.vi.2006, Farnell Farm, Rolvenden, East Kent, TQ8230; *Auplopus carbonarius* (Scopoli), 15.ix.2008, suburban garden, Northampton, SP7762; *Evagetes crassicornis* (Shuckard), 14.ix.2005, Hills & Hollows Reserve, Northampton, Northamptonshire, SP7663.

Dickson, R. – Sawflies recorded during a Malaise Trap survey of Titchfield Haven NNR in South Hampshire (SU5302) in 2008. Tenthredinidae: *Ametastegia albipes* (Thomson), 9/10.v.2008 & 13/14.v.2008; *Athalia scutellariae* Cameron, 30/31.v.2008, 7/8.vii.2008 & 8/9/vi.2008; *Croesus latipes* (Villaret), 3/4.vii.2008; *Dolerus germanicus* (Fabr.), 20/21.vii.2008 & 22/23.vii.2008.

Gibbs, D – Scarce Hymenoptera collected in 2008. Anthophoridae: *Anthophora retusa* (L.), 22.iv.2008, Hines Pit, Stokeford Heath, Dorset, SY8888. Megachilidae: *Heriades truncorum* (L.), 8.vii.2008, Waltham Place, White Waltham, Berkshire, SU8577.

Halstead, A. – Some local or uncommon sawflies taken in 2008. Tenthredinidae: *Pachynematus clibrichellus* (Cameron), 3.vii.2008, Cairn Gorm, Easterness, NH999167, swept at 1000m; *Perineura rubi* (Panzer), 10.v.2008, Chambers Farm Wood, SE of Wragby, Lincs., TF147743, swept; *Pristiphora leucopus* Hellen, 10.v.2008, Hardy Gang Wood, SE of Langworth, Lincs., TF094748, swept; *Tenthredo mioceras* (Enslin), 3.vii.2008, Cairn Gorm ski lift car park, Easterness, NH989059.

Wheeler, K. J. – Aculeate Hymenoptera recorded during a Malaise trap survey of Titchfield Haven NNR in South Hampshire (SU5302) in 2008. Chrysididae: *Chrysis ignita* (L.), 8.vi.2008 & 9.vi.2008. Pompilidae: *Auplopus carbonarius* (Scopoli), 25.v.2008 & 13.vi.2008; *Dipogon variegatus* (L.), 31.viii.2008. Tiphiidae: *Tiphia minuta* Vander Linden, 9.vi.2008. Vespidae: *Vespula germanica* (Fabr.), 4.v.2008. Apidae: *Bombus pascuorum* (Scopoli), 26.iv.2008.

General

Fry, R. A. – Colour prints of the life cycles of various moths. The exhibitor's aim is to compile a comprehensive collection of digital photographs showing the egg, a range of larval stages (to cover polymorphism), pupae and adults of all species of UK Lepidoptera. The collection currently comprises 7000 photographs of >750 species and can be viewed at http://www.ukleps.org. Anyone wishing to contribute to the project should contact the exhibitor via the website which has contact details.

Simpson, M. – An exhibit about the life of Edward Wiltshire, a renowned lepidopterist, consular official and past Editor of the Proceedings of the South London Entomological & Natural History Society. The exhibit consisted of (1) his obituary in the Daily Telegraph dated 4 September 2004, (2) an extract from John Dickie's 'The British Consul' which pays tribute to his more than 40 years of

distinguished service in the diplomatic corps (3) a photograph of E. P. Wiltshire in official regalia at the British Political Agency, Bahrain, 1960 (4) a reprint from 'Endeavour', October 1959, by H. Kettlewell entitled 'Brazilian Insect Adaptations'. Kettlewell's 1958 Brazilian assignment coincided with E. P. Wiltshire's posting to Rio de Janeiro and the two spent time working together in the Corcovado forests. Bernard Kettlewell's wife, Hazel, was a cousin of E. P. Wiltshire. (5) an article written by EPW in the Transactions of Suffolk Natural History Volume 18, describing the early days of his interest in Lepidoptera when he lived at Gorleston-on-Sea and as a student at Jesus College, Cambridge (6) various postcards and photographs.

SHORT COMMUNICATIONS

Occurrence of a rare colour form of the common spittlebug *Philaenus spumarius* (L.) (Hemiptera: Aphrophoridae). – The spittlebug, *Philaenus spumarius* (L.) has 11 distinct colour pattern morphs in Britain, of which three are designated non-melanic and eight melanic (Stewart & Lees, 1996). These morphs are considered to exhibit a balanced polymorphism, with frequencies of the colour morphs varying between populations in relation to hostplant, habitat, parasitoid pressure and region. The genetic control of the colour morphs in British populations has been resolved by Stewart & Lees (1988). The commonest colour morphs are *typicus*, *populi* and *trilineatus* which usually account for >80% of individuals in most populations. One of the rarest colour morphs, f. *praeusta*, is considered a minor modification of f. *trilineatus* and is rarely reported. The average % frequency of this morph across England and Wales recorded by Stewart and Lees (1996) was 0.62% (cf. 46% for f. *typicus*).

It is thus worth noting the presence of this colour morph at Callis Community Gardens, (GR SD973265) near Hebdon Bridge, on 15th August 2008 (Plate 4, Fig. 1). Despite its apparent scarcity, it has since been learnt that the sites sampled by Stewart and Lees (1996) in Yorkshire showed above average frequencies of f. *praeusta*. The reason(s) for the higher frequencies in this region are not known. – COLIN DUKE, 46, Meadway, Bradford BD6 2SP. colin.duke@dial.pipex.com

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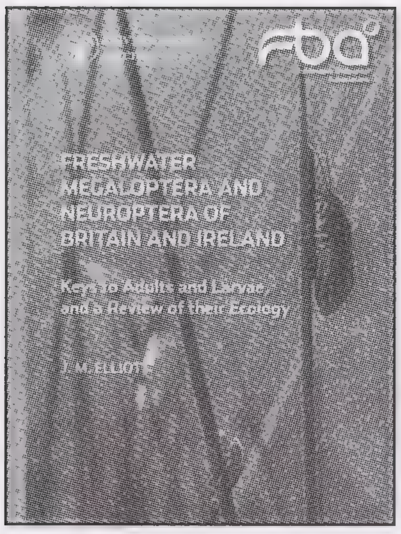
Stewart, A. J. A. & Lees, D. R. 1996. The colour/pattern polymorphism of *Philaenus spumarius* (L.) (Homoptera: Cercopidae) in England and Wales. *Philosophical Transactions of the Royal Society of London, Series* B **351**: 69–89.

***Propsocus pulchripennis* (Perkins) (Psocoptera: Elipsocidae) in West Sussex**. – I took a single female of this distinctive species (Plate 4, Fig. 2) at the base of plants growing on fine shingle at the edge of a saltmarsh (close to high tide mark) at Dell Quay, West Sussex (SU836026) on 23.vii.2009. The habitat would appear to be similar to those where the species was first found in Britain on St. Marys, Isles of Scilly in September 2000 (Saville, B, Alexander, K. N. A, Dolling, W. R. & Kirby, P. 2005 Some notable British Barkfly (Psocoptera) observations. *Entomologist's Record*, **117**: 35–39), and the first from East Sussex (Saville, R. E., Alexander, K. N. A, Bratton, J. H., Clemons, L., & Oldfield, M. 2007, Additional Notable Barkfly (Psocoptera) records. *Entomologist's Record*, **119**: 113–115). – JONTY DENTON, Old Hall Place, Hussell Lane, Medstead, Hants, GU34 5PF.



BOOK REVIEW

Freshwater Megaloptera and Neuroptera of Britain and Ireland: keys to adults and larvae, and a review of their ecology by J. M. Elliott. Freshwater Biological Association Scientific Publications No. 65 with support from The Environment Agency. 71pp. £19.00. ISBN 978-0-900386-77-0; ISSN 0367-1887.

The Megaloptera and Neuroptera are among the most primitive of the endopterygote insects, being close to the ancestral stock of the panorpoid complex which includes the Lepidoptera, Trichoptera, Mecoptera, Siphonaptera and Diptera and consequently they possess exquisitely beautiful and complex wing venation patterning, both fore and aft. This updated key is specifically restricted to aquatic species and covers three species of alder-fly (Megaloptera: Sialidae) and four species of lacewing (Neuroptera: Osmylidae and Sisyridae). Their low diversity belies their ecological importance in defining aquatic habitat quality and the first FBA key to this grouping was consequentially written by D. E. Kimmins as early as 1944, with a second edition in 1962 and a third (Malcolm Elliott's first) in 1977. The addition of *Sialis nigripes* Pictet to the British list in 1977 prompted a fourth edition in 1996: but being out of print for some years, it was decided a new fifth edition was required.

The keys to adult insects are well-illustrated and easy to follow. However, having established a species' provisional identity I would have preferred some distributional and ecological information to follow in order to help confirm my identification. This information is available in the section devoted to life cycles and ecology at the end of the book, but it is not as easy to find as it should be. The distributional information provided is largely at the European level, listing the species occurrence by country or region, which is useful for an overview, but perhaps not quite providing the necessary detail required by British entomologists surveying freshwater habitats in the U.K. The incorporation of a few maps here would have strengthened the book's use considerably.

The book, of course, is aimed at those who are engaged in studying freshwater life and so a large section is devoted to descriptions of the immature aquatic stages. The keys are well-illustrated, and easier to use, with older, larger instars (there are up to 10 instars). The author admits it has not been possible to construct a satisfactory key to larvae of the sponge-flies (*Sisyra* species) owing to lack of properly-identified material, even from Europe. This is a bit surprising these days in view of the fact that many non-destructive molecular techniques have been available for identifying sibling species for at least a decade. However it is probably true that the morphological differences between these species remain fairly similar.

The book ends with a very useful, detailed account of the ecology of each species, where this is known. This is perhaps the real strength of the book. Those terrestrial entomologists amongst us (and I include myself in this happy band) will find the book very useful for identifying the adults of these two neuropteroid orders and is a 'must-buy'. The book is infinitely better than the infamous FBA key to British caddis-flies, No. 28, which avoided providing any information on a species status, such that one never knew whether the 'identified' specimen before you was a northern Scottish relict with five specimens known to science or a widespread southern caddis found in every pond in the country – all to save a little money one presumes – and this book remains our standard text today after 36 years. I just don't understand how taxonomists can (be allowed to) write half a key.

JOHN BADMIN

THE CURRENT STATUS OF THE SOUTHERN GREEN SHIELD BUG, *NEZARA VIRIDULA* (HEMIPTERA: PENTATOMIDAE), AN INTRODUCED PEST SPECIES RECENTLY ESTABLISHED IN SOUTH-EAST ENGLAND

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Abstract

In 2003 the southern green shield bug, *Nezara viridula* (L.) was found to be breeding in south-east England. The Royal Horticultural Society's members' advisory service first received outdoor records of this plant pest in 2004, and the Natural History Museum Insect Information Service in 2006. Both services have received verifiable reports of *N. viridula* each year since. Most post-2002 records of *N. viridula* have been of nymphs, reported in late summer or autumn, when plant damage from this insect is less likely to be serious. The current distribution, host range and potential pest status of *N. viridula* in the UK are discussed.

Introduction

The southern green shield bug (*Nezara viridula* (L.)) (Hemiptera: Pentatomidae) (Plate 4, Fig. 3), also known as the green vegetable bug, is highly polyphagous and a serious pest of food and fibre crops in many parts of the world (Todd, 1989). It has a cosmopolitan distribution, primarily in the tropical and subtropical regions, but has been established across large parts of Europe for some time (see CABI, 1998). Since at least 1930, *N. viridula* has been regularly intercepted in the UK by the plant quarantine service on a wide range of imported plants and produce, sometimes in large numbers. However, there were no known breeding populations of *N. viridula* in the UK before 2003 (Reid, 2006). In 2003, three breeding colonies of *N. viridula* were reported outdoors in London (Barclay, 2004; Shardlow & Taylor, 2004).

The adult of *N. viridula* is superficially similar to that of the UK native green shield bug *Palomena prasina* (L.), but at 11.0–15.0 mm long it is usually larger than *P. prasina* (12.0–13.5 mm) and has a clear membrane at the tips of the forewings, unlike the brown membrane of *P. prasina*. In addition *N. viridula* usually has three to five small white spots at the base of the scutellum, with a tiny black spot close to each corner and the punctuation is concolourous green, not black as in *P. prasina*. The nymphs are readily distinguished from other Pentatomidae present in the UK; fifth instars have four rows of white markings on the greenish abdomen, with pinkish red markings around the edge of the abdomen and pronotum. Earlier instars have a black abdomen with white spots, and red markings on the edge of the pronotum. A detailed description and notes on identification of *N. viridula* are provided by Barclay (2004).

The life history of *N. viridula* was reviewed by Todd (1989). In summary, the adults hibernate in sheltered places, with overwintering adults usually turning brown. Adults emerge in the spring and begin to feed and mate almost immediately. The

eggs are pale yellow and deposited in polygonal clusters; these take from five days to three weeks to hatch. As with most other Pentatomidae, *N. viridula* develops through five nymphal instars. The complete life-cycle from egg to adult is temperature-dependent and can range from 24 to 60 days (Knight & Gurr, 2007) and up to six generations are thought to be possible in a season (Panizzi *et al.,* 2000).

Reports of *N. viridula* nymphs have been made each year since 2003, many via the Royal Horticultural Society (RHS) members' advisory service and the Natural History Museum (NHM) Insect Information Service, indicating that *N. viridula* is established as a breeding insect in south-east England. These reports are discussed with reference to the shield bug's establishment and its potential to become a plant pest in the UK.

Establishment and distribution in the UK

Nezara viridula is an occasional accidental import into the UK. Between 1930 and 2007 there were 23 recorded interceptions of *N. viridula* by the Plant Health and Seeds Inspectorate (Fig. 1) (Reid, 2006). Twenty-two of the interceptions were of adults, but details of the life stage(s) from the other interception were not recorded; 17 were associated with imported plant material, with Italy the most recurrent country of origin (Reid, 2006). This is likely to under-represent the number of occasions *N. viridula* has been accidentally imported, as this insect is known to be a stow-away with imports of fruit and vegetables (Southwood & Leston, 1959). Additional records of *N. viridula* associated with imported material known to the authors are an adult in 1997 with watercress from a London supermarket (RHS data) and in 2004 a nymph found in a pallet of Spanish raspberries in Camborne, Cornwall (B. Nau, *pers. comm.*).

It was thought unlikely that *N. viridula* would become established in the UK (Southwood & Leston, 1959). However, in August and September 2003, nymphs of *N. viridula* were recorded from several locations in London (Barclay, 2004; Brooke, 2004; Shardlow & Taylor, 2004). These were the first reports of nymphs on plants that had not been recently imported, indicating probable breeding of *N. viridula* in the UK. Since 2003 there have been four additional published reports of *N. viridula* nymphs: Isleworth, Middlesex (Ismay & Schulten, 2006); Stanford, Essex (Harvey, 2008) and Staines, Middlesex (Diver, 2008). Andrew Halstead also observed nymphs in Brookwood and Knaphill, Surrey, in 2005 and 2006. The Food and Environment Research Agency (FERA) received nymphs from Chertsey and Egham (Surrey) in 2006. Nymphs were also reported from Cambridge in 2007 (B. Nau, *pers. comm.*).

The first outdoor report of *N. viridula* to the Royal Horticultural Society was received in August 2004 from Chiswick, London. Records of *N. viridula* received by the RHS are only considered valid when accompanied with samples or photographs, or when an accurate written or verbal description of the distinctive nymphs is provided. Verbal/written descriptions of the adult are discounted due to possible confusion with *P. prasina*. Thirty-six verifiable records of *N. viridula* were received between 2004 and 2008, all from London and adjacent areas of Surrey, Essex and Kent. All 36 records of *N. viridula* included the presence of nymphs.

Between 2004 and 2009 staff at the Natural History Museum received 19 verifiable outdoor records of *N. viridula*. Most records were from London, including one site where *N. viridula* was found to be present each year from 2005 to 2009 (near Colindale Tube Station, TQ28, Dr. J. Starr). One record of nymphs (M. Shardlow, *pers. comm.*) was received outside the London area from near Southampton, Hampshire (SU4401) in May 2005.

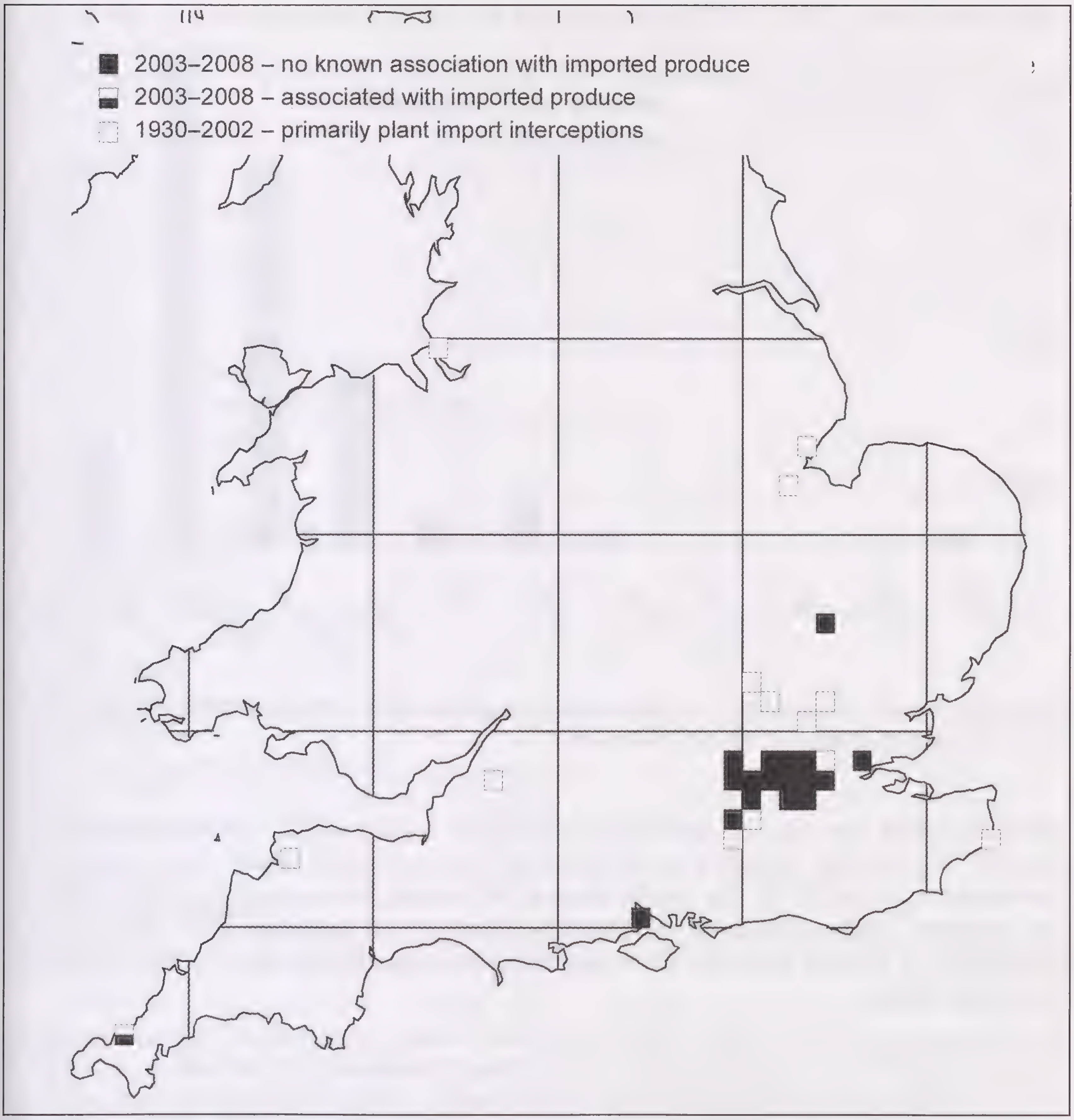

Fig. 1. Map of southern green shield bug *Nezara viridula* distribution in England, 10 km squares. RHS/FERA/NHM and published data (at March 2009). Produced using Dmap.

In total the authors are aware of 77 outdoor records of *N. viridula* between 2003 and 2008, 65 with nymphs present. These records indicate that the bug is established in London and some surrounding areas. The status of this insect in Cambridge (recorded 2007) and near Southampton (recorded 2005) is unknown as no records of *N. viridula* have been received from these areas since the original reports.

Temporal distribution of UK records

Nezara viridula may have up to six generations a year in favourable conditions (Panizzi *et al.*, 2000). However 66 (86%) of the 77 UK sightings were made between July and November, and over 60% of records were reported in September or October (Fig. 2). The bug has only been recorded outdoors on one occasion in May, three occasions in June and two occasions in July; five of these records are

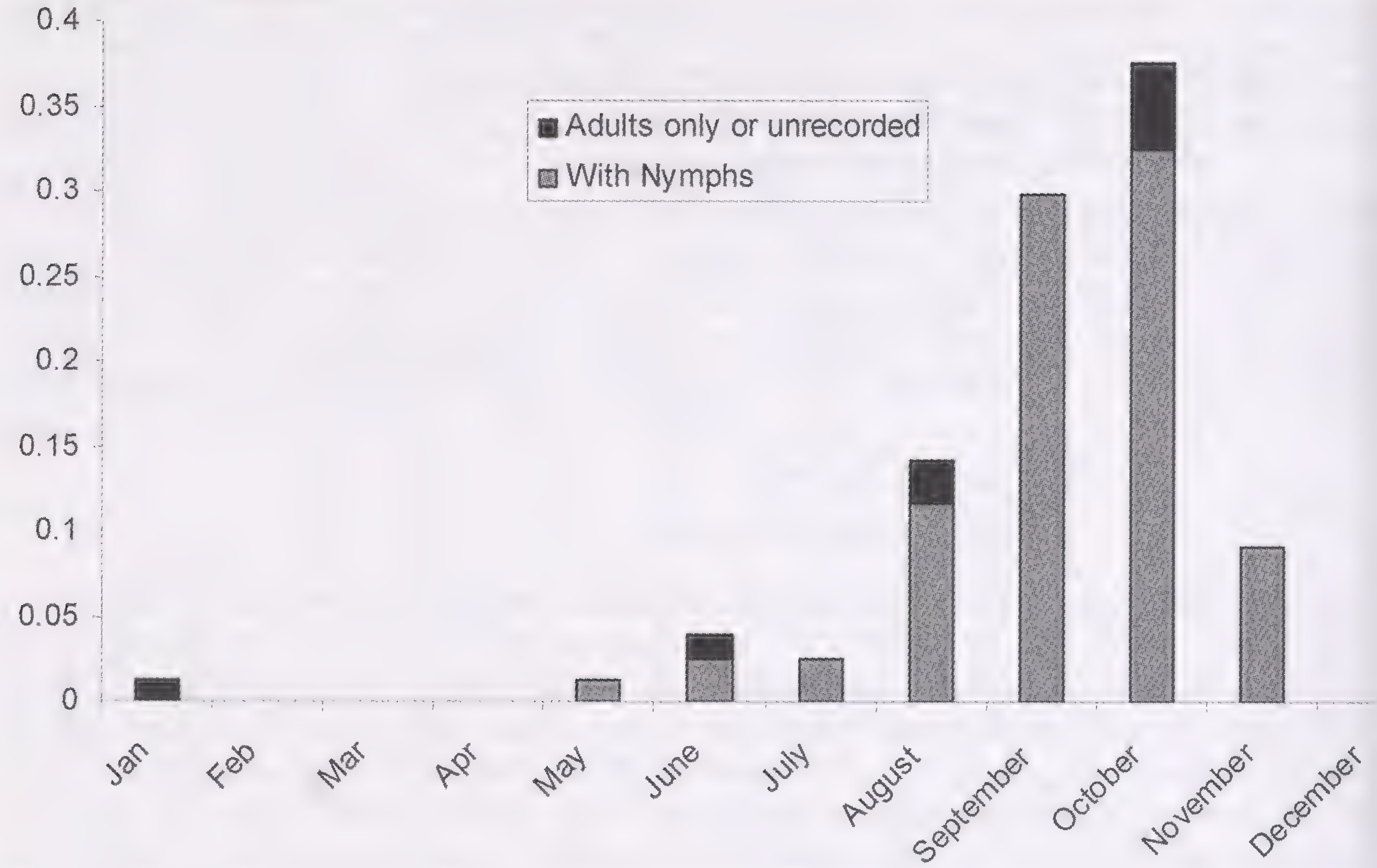

Fig. 2. Proportion of post-2002 *Nezara viridula* nymph records by month. RHS, FERA, NHM data and published data at March 2009 ($n = 77$).

associated with nymphs. To date there is only one record of the overwintering brown form of *N. viridula*, which was collected in January 2008 inside the Entomology Department of the NHM, by Gavin Broad. With nymphs in most cases appearing in late summer and autumn, it is probable that there may be only one or two generations a year in the UK, although there are insufficient data to conclude that this is the case.

Host range and potential plant damage in the UK

Nezara viridula is a pest of a wide range of plant species (Todd, 1989). The bug feeds by sucking sap from the foliage and developing fruits, pods and seed heads. This can result in fruits and pods failing to develop or doing so in a distorted fashion. Shield bugs can also taint edible crops by releasing a foul-tasting substance onto the crop when they are disturbed. In the UK, 50 of the 77 post-2002 records of *N. viridula* have information on the plants on which they were found (Table 1). Runner bean and other food crops account for more than 50% of the records and garden ornamental plants most of the rest. However, most of these records were made in late summer and autumn (Fig. 2) when harvesting of susceptible fruits and vegetables was nearing completion. Plant damage at this late stage is unlikely to affect the quantity or quality of the crop. Because of this, *N. viridula* is not a major pest in the UK at the present time but could become more significant if heavier infestations develop earlier in the growing season.

Discussion

The southern green shield bug, *N. viridula*, has become established in London and some surrounding areas. Its distribution may be restricted by cold winters but it is

Table 1. Observations of *Nezara viridula* on plants in the UK, post-2002. RHS/FERA/NHM and published data.

Host	Number of reports
Abelia sp.	1
Abutilon sp.	1
Agapanthus sp.	1
Alcea sp. (Hollyhock)	2
Alyssum sp.	1
Bamboo	1
Caryopteris sp.	1
Eruca sativa (Rocket)	1
Eupatorium cannabinum (Hemp agrimony)	1
Euphorbia sp. (Spurge)	1
Fuchsia sp.	1
Hibiscus sp.	1
Ipomea sp. (Morning glory)	1
Knautia sp. (Scabious)	1
Lavandula sp. (Lavender)	1
Lycopersicon esculentum (Tomato)	2 (seen feeding in one case)
Phaseolus coccineus (Runner bean)	24
Pyrus sp. (Pear)	1
Rorippa nasturtium-aquaticum (Watercress)	1
Rosa sp. (Rose)	1
Rubus sp. (Raspberry/Blackberry)	3
Salix sp. (Willow/sallow)	2
Sollya sp.	1
Stipa sp.	1
Viburnum sp.	1
Solidago sp. (Goldenrod)	1

likely to survive in sheltered places, such as London gardens, where winter frosts have become uncommon in recent years. However, its life-cycle, host range and pest status in the UK require further investigation. The small number of pre-July reports indicates that *N. viridula* is present at low densities in the early part of the summer, only becoming noticeable in late summer, presumably as numbers increase. If this remains the case in the UK, damage to edible crops and garden ornamental plants may remain slight, as by late summer/early autumn damage to annual crops is likely to be unimportant.

When a species such as *N. viridula* becomes established further north than previously, climate change is often implicated. There is some evidence that this is the case with *N. viridula*. Its spread northwards in Japan has been correlated with increased winter temperatures (Musolin & Numata, 2003; Musolin, 2007). However, movement north is not without some cost, because in temperate climates *N. viridula* has an adult diapause. At the new northern edge of its range in Japan, adult diapause in *N. viridula* was induced after mid-September. This late diapause resulted in female oviposition in late summer/early-autumn when the progeny had no chance of attaining adulthood and were therefore unlikely to survive the winter (Musolin & Numata, 2003). It is possible that similar late-season ineffective reproduction is occurring in the UK, as the majority of reports of *N. viridula* have been made in the autumn and most are of nymphs.

Nezara viridula is established in the UK and its distribution may continue to expand. Its lifecycle in the UK needs investigation, and its future pest status is unclear. However, *N. viridula* is a pest through much of its range and it should be assumed that it will cause problems in the UK in future if it occurs in greater numbers earlier in the summer.

Acknowledgements

Thanks are due to Chris Malumphy and Bernard Nau for their help and assistance in preparing this report. We are also grateful to G. Broad, M. Shardlow, J. Starr, the public, and staff of the RHS and NHM, who have submitted reports of *N. viridula*.

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THE HABITAT AND CONSERVATION REQUIREMENTS OF THE NEWLY RECOGNISED BRITISH PLUME MOTH *EMMELINA ARGOTELES* (LEPIDOPTERA: PTEROPHORIDAE)

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ABSTRACT

The plume moth *Emmelina argoteles* (Meyrick) was first recorded in Britain at Wicken Fen, Cambridgeshire in June 2005, and in August 2006 the species was confirmed as breeding at the site. The species is known to feed on hedge bindweed *Calystegia sepium* as a larva and is thought to require damp fen or marsh habitats. A one-year field survey was conducted at Wicken Fen to determine the optimum habitat conditions and management for the moth. Larval abundance was directly correlated with the height and density of the surrounding vegetation. The largest numbers of larvae were recorded in areas where management and disturbance were minimal. Site management recommendations include cutting on no more than a three-year rotation and ensuring that no more than one half of an area is cut in any one year. In addition, cutting should be avoided between May and September, as larvae are feeding at this time of the year and require tall vegetation. Recommendations for further research on the conservation requirements of *E. argoteles* are discussed.

INTRODUCTION

The first British record of the plume moth *Emmelina argoteles* (Meyrick) (Pterophoridae) (Plate 4, Fig. 4) was made on 24 June 2005, when Jeff Higgott and Stuart Read captured a male specimen at a mercury vapour light at Wicken Fen in Cambridgeshire (Higgott, 2006). A second male specimen was obtained in the same area of the Fen (Sedge Fen) by Jeff Higgott approximately one year later on 5 July 2006. Capturing two specimens from the same area suggested that the species was breeding at the site. To determine whether this was the case, larvae of the genus *Emmelina* were collected in August 2006, reared through and the presence of *E. argoteles* was confirmed through dissection. It is necessary to dissect specimens as the species' external characters overlap greatly with those of the closely related and far more widespread species *Emmelina monodactyla* (L.), although *E. argoteles* tends to be slightly smaller. The two species can be easily distinguished through examination of the genitalia. The male genitalia (Plate 4, Figs 5 & 6) are quite distinct (Derra, 1987; Gielis, 1996). The differences in female genitalia are more subtle but work by Brian Goodey using material from Wicken Fen has greatly aided understanding of the differences (http://www.dissectiongroup.co.uk/).

The life history and habitat requirements of the species are very poorly understood. The available literature describes approximate flight periods (April, June, August and September) and larval host plants as hedge bindweed *Calystegia sepium* and sweet potato *Ipomoea batatas* (Gielis, 1996), though none of this information was recorded from Britain. Both known host plants belong to the family Convolvulaceae.

The global distribution of *E. argoteles* is widespread but very localised, with the species recorded in Europe from France, Austria, Germany and Hungary, as well as in the Far East from Japan and China (Gielis, 1996). Alipanah and Ustjuzhanin (2005) added the species to the list for Iran and also state that it has been recorded in India and Georgia, as well as several countries in Europe. In addition, the species has been recorded twice in Spain (Murria Beltrán, 2006) and once in Mallorca (M. R. Honey, *pers. comm.*).

It is suggested that *E. argoteles* prefers damp fen or marsh habitats (Gielis, 1996). This is in contrast to *E. monodactyla*, which is widespread and occurs in any habitat where its larval food plants are found. The only information available on *E. argoteles* in Britain is that it has been confirmed as breeding at Wicken Fen. The moth's abundance, habitat requirements, life history and geographical distribution in Britain are not known and it is therefore not possible at present to determine the conservation status of the species.

A one-year research project commenced in April 2007 with the aim of establishing the general ecology and habitat requirements of *E. argoteles* in Britain. This paper presents details of field survey work conducted at Wicken Fen, identifies the optimum habitat conditions and makes recommendations for management of sites where the species occurs. Findings from the project relating to the life history of the species are presented in Ringwood, Roscoe & Higgott (2008).

Methods

Site description

Wicken Fen occupies approximately 660 hectares and is located mid-way between Ely and Newmarket in Cambridgeshire. The site is owned and managed by the National Trust. The Fen is characterised by large areas of great fen sedge *Cladium mariscus* and common reed *Phragmites australis* bisected by ditches and lodes. Grazing is practised in the southern part of the Fen and patches of scrub and woodland can be found across the site. The Fen is often cited as one of Britain's oldest nature reserves and its value is recognised by designations as a National Nature Reserve, SSSI, Special Area of Conservation and a Ramsar site.

Four sites were identified within Wicken Fen for the surveys and details of each are given in Table 1. The sites were chosen to represent a variety of conditions, but all four had *C. sepium* present and were 500 m^2 in size. Conditions ranged from an exposed area with no *P. australis* present (The Mere) to an area with tall, dense fenland vegetation and an abundance of reeds and sedges (Thomsons). The Wicken Lode site was where *E. argoteles* larvae were first collected when the species was confirmed as breeding at Wicken Fen in August 2006. *Emmelina argoteles* had not been recorded at any of the other three sites at the commencement of the project.

Field surveys

The field surveys were conducted with the aim of obtaining data on the presence and abundance of *E. argoteles* in relation to vegetation structure and composition, as well as to site management.

Surveys were conducted at each of the four sites once a month (mid month, 12–18th) from May to September 2007. Each survey consisted of a timed 15-minute search for *Emmelina* larvae (there are no known differences between *E. argoteles* and *E. monodactyla* in the larval stage) across each site. This involved randomly

Table 1. Survey sites at Wicken Fen, 2007

Site Name	Grid Reference (Ordnance Survey)	Site Description and Current Management
Wicken Lode	TL 562 704	Damp linear area, adjacent to a watercourse, with a high level of plant species diversity and an abundance of *P. australis* and *C. sepium*. The site has an area of carr along one boundary and a public footpath running through its centre. Area is flailed annually (weather dependent) in September or October; cuttings raked into litter heaps, which are left in-situ to decompose.
Thomsons	TL 559 705	Fenland area with tall, dense vegetation with an abundance of reed canary grass *Phalaris arundinacea* and *P. australis*. The area also supports an abundance of other typical fen vegetation, including great fen sedge *C. mariscus* and soft rush *Juncus effusus*. Cut using a disc mower, on a three year rotation generally during July or August; last cut in 2005; cuttings left to dry and then raked off into litter piles, which are left in-situ to decompose.
Brickpits	TL 557 708	Linear fenland site, sheltered along its two longest boundaries by scrubby areas of carr. The site supports an abundance of *C. sepium*, *J. effusus* and *P. australis*. Scrub cut back as required; flailed sporadically.
The Mere	TL 559 699	Damp exposed area with an abundance of purple small-reed *Calamagrostis canescens*, *C. sepium* and several species of rush (*Juncus* spp.). Extensively grazed by Highland cattle on a free range basis at a density of one animal per 3 ha. The animals tend to graze the survey site over the winter period.

searching leaves and stems of *C. sepium* and surrounding vegetation by hand and eye. When a larva was found, the following information was noted: larval body length, plant species on which it was recorded and height from the ground. In addition, the plant part (stem; unopened fresh leaf or mature leaf) on which the larva was found was recorded. If on a mature leaf, the length and width of the leaf was measured. The behaviour of the larva when it was first sighted was also recorded, using the following behavioural categories: feeding (eating of plant evident), stationary (no feeding or movement apparent), crawling (locomotion), searching (head and front legs moving from side to side) and abseiling (dropping from vegetation on the end of a thread of spun silk). On sighting a larva, the clock was stopped to enable the required information to be recorded, before recommencing the timed search.

In addition, during every monthly survey three 2 m × 2 m quadrats were randomly placed at each site. Within each quadrat the following information was recorded: % ground cover of vegetative species, vegetation height, vertical vegetation density and abundance of *Emmelina* larvae. Vegetation height was measured with a ruler, using a direct measurement method (Stewart, Bourn & Thomas, 2001), at three random locations within each quadrat. The vertical vegetation density was recorded using a modified version of the board method (Bibby, Burgess & Hill, 1992; Dudley *et al.*,

1998). This involved using a white board with a grid marked out on it. The board measured 50 cm in width by 150 cm in height and was divided, vertically, into three sections, each measuring 50 cm in height. The division into three sections enabled the density of vegetation at three different heights from ground level to be recorded: 0–50 cm, 51–100 cm and 101–150 cm. The grid on each of the sections was divided into 100 squares, each measuring 5 cm × 5 cm. The vertical vegetation density was recorded by one person holding the board at three random locations within the quadrat and a second person standing three metres away from the board and counting the number of squares (out of a hundred) on the grid, for each of the three sections (0–50 cm, 51–100 cm and 101–150 cm), that were obscured by vegetation, thereby enabling a '% vegetational density' score to be calculated. The abundance of *Emmelina* larvae within the quadrat was recorded during a five-minute random search. The search involved scanning all *C. sepium* plants within the quadrat for larvae and recording the number observed. When a larva was sighted, the information outlined in the paragraph above was collected using the same method.

All *Emmelina* larvae observed were collected, bred through to adult in captivity and dissected to enable the species and sex to be determined.

Results

Ninety-six percent of *Emmelina* larvae collected at Wicken Fen proved to be *E. argoteles*. The largest numbers of *E. argoteles* larvae were recorded in alternate months, with peak numbers observed in May, July and September (Fig. 1). The highest number of larvae (35) was recorded in July and the lowest number in August (3). June was also a month with low numbers of larvae, with only five recorded. The sex ratio of the larvae was approximately 1:1 (47:53 (♂:♀) based on the entire survey period. There were, however, monthly variations in sex ratio, with the proportion of females highest in May and June and the proportion of males highest in July and September.

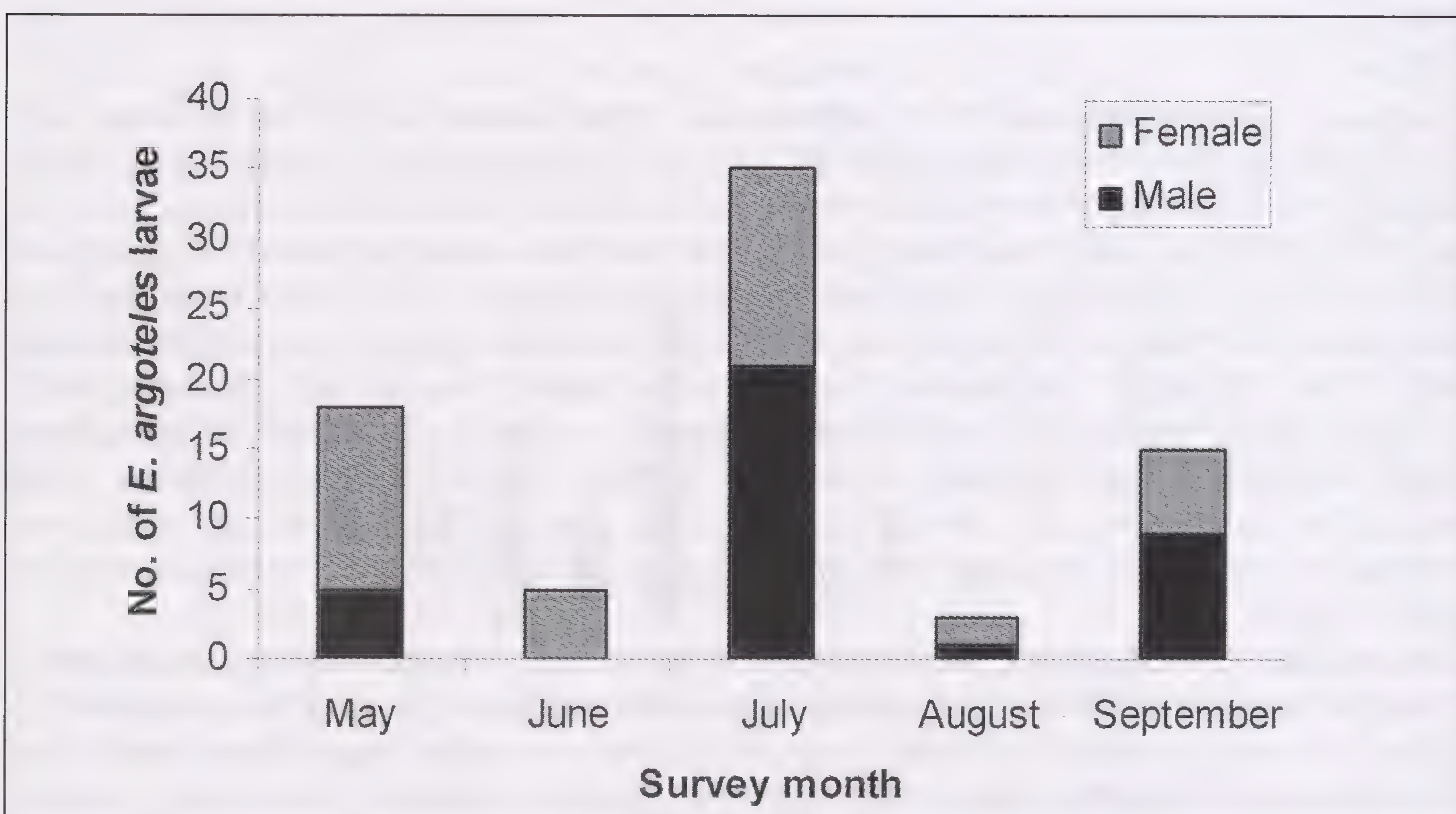

Figure 1. Total number and sex ratio of *Emmelina argoteles* larvae collected each month at Wicken Fen, 2007.

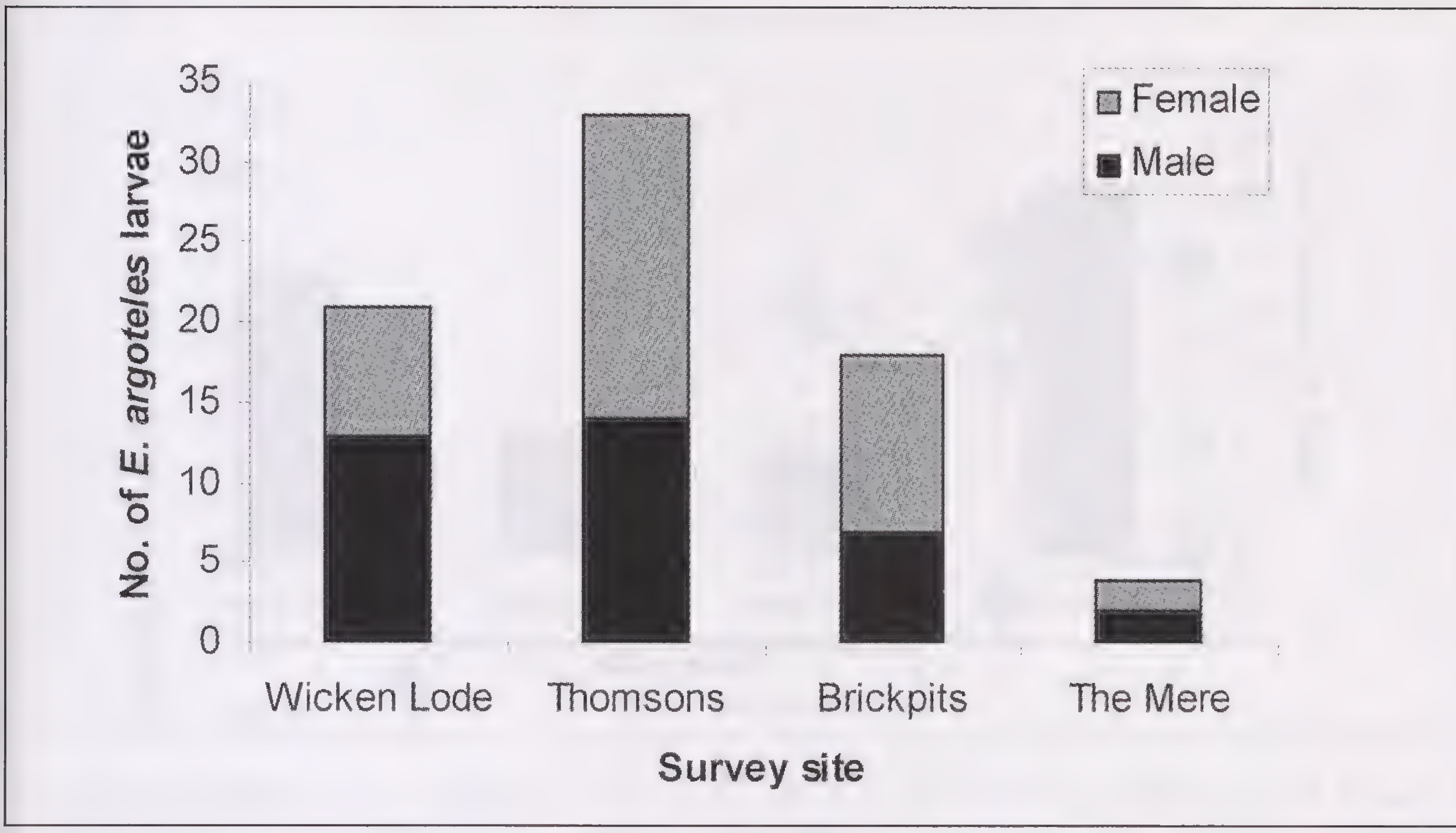

Figure 2. Total number and sex ratio of *Emmelina argoteles* larvae collected at each site at Wicken Fen, 2007.

The difference in the total numbers of *E. argoteles* larvae recorded from each of the four sites was very pronounced (Kruskal-Wallis: $\chi^2 = 8.07$, $P < 0.045$) (Fig. 2). The greatest number of larvae (33) was found at Thomsons and the lowest number (4) at The Mere. There were slight discrepancies in the ratio of male to female at Wicken Lode, where 62% were male, and at Brickpits, where 61% were female.

The larvae were found on *C. sepium*, the host plant at heights of 325–1360 mm above ground (mean $\pm$ s.e. $= 799 \pm 27.6$ mm) (Fig. 3). They were most frequently recorded between 700 and 800 mm with 21% of all larvae recorded between these heights.

The majority of *Emmelina* larvae were found on either mature *C. sepium* leaves (52%) or fresh, unopened terminal leaves (45%). Only 3% (two larvae) were

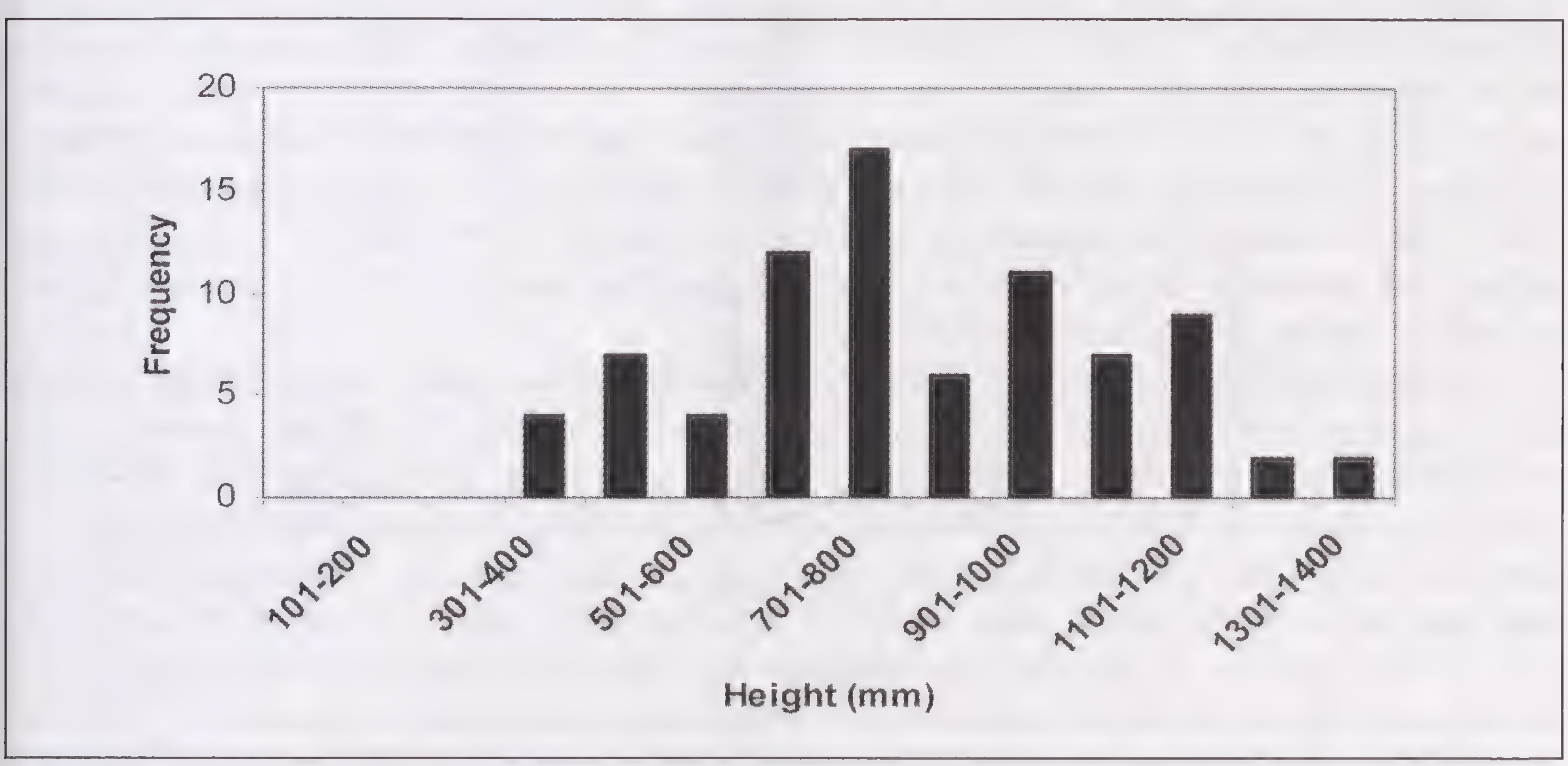

Figure 3. Frequency of *Emmelina* larvae recorded above ground level ($n = 81$).

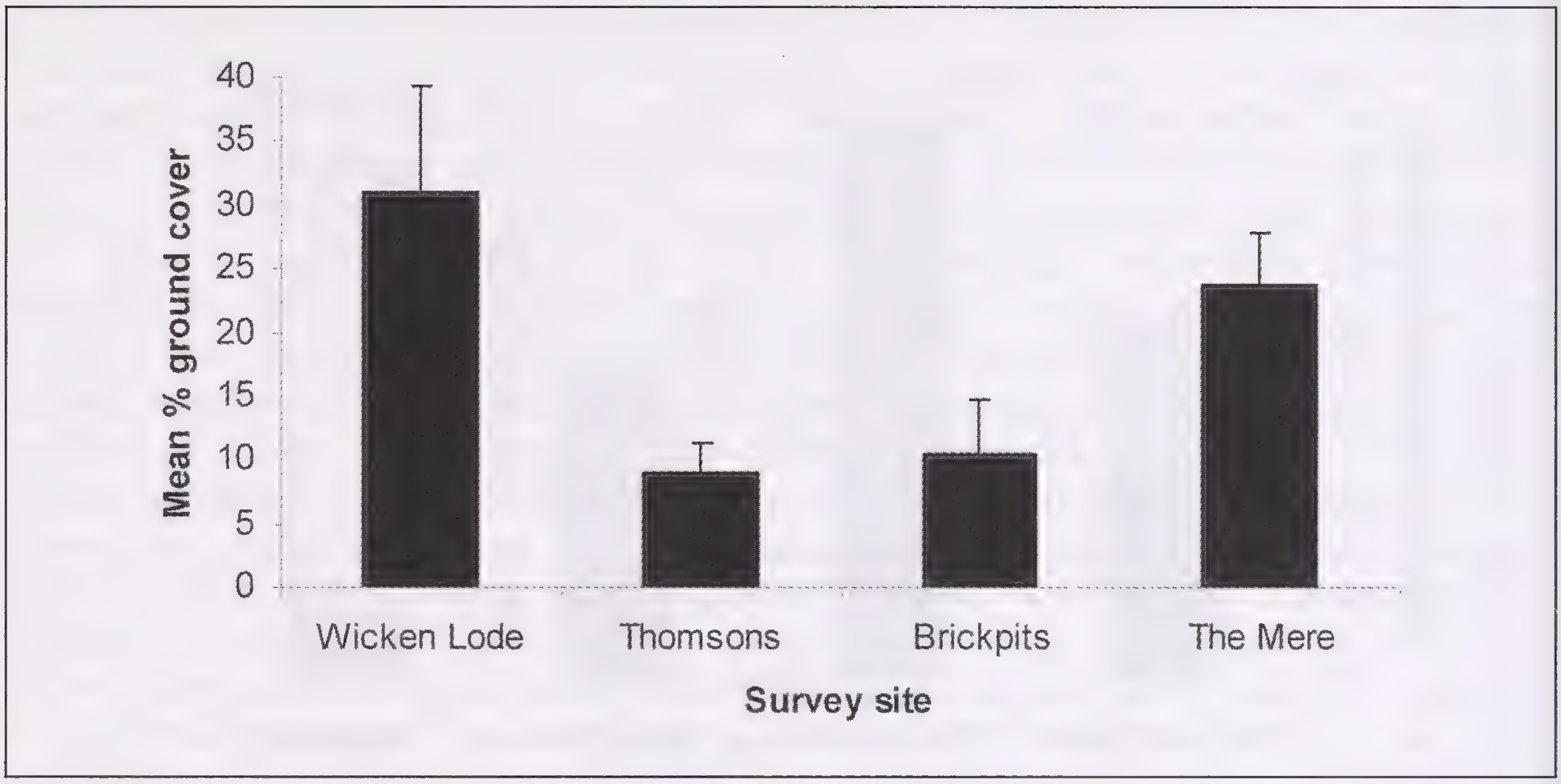

Figure 4. Mean percent ground cover of hedge bindweed (*C. sepium*) at each site over the survey period.

recorded on a stem of *C. sepium*. The mean size of the mature leaves on which the larvae were observed was 21 mm (s.e. ±0.96) in length by 10 mm (s.e: ±0.57) in width. The largest and smallest leaves on which larvae were recorded measured 42 × 19 mm and 10 × 7 mm, respectively. The larvae recorded on mature leaves tended to be larger (mean ± s.e. = 5.68 ± 0.43 mm body length) than those recorded on fresh, unopened terminal leaves (mean ± s.e. = 3.98 ± 0.40 mm body length). The larvae recorded on stems were largest of all (mean ± s.e. = 10 ± 1.00 mm) and also tended to be recorded higher (mean ± s.e. = 1055 ± 15.00 mm) on the vegetation than other larvae. When larvae were sighted they tended to be stationary with no feeding apparent (64% of observations), although 20% were crawling, 11% feeding and 5% searching.

The mean percentage ground cover of *C. sepium* at the four sites varied from 9% at Thomsons to 31% at Wicken Lode and was significantly different between sites (Kruskal-Wallis; $\chi^2 = 29.49$; $P < 0.001$) (Fig. 4). The height of the vegetation at The Mere was considerably lower than at the other three sites over the entire survey period (Fig. 5). At The Mere, the maximum mean height (897 mm) occurred in May, whereas at Thomsons, the site with the tallest vegetation, the maximum mean height (1633 mm) occurred in August. A positive correlation ($r_s = +0.498$; $P < 0.025$) was calculated between mean vegetation height and the number of *E. argoteles* larvae recorded during the quadrat surveys.

The density of the vegetation (Table 2) was relatively similar between sites at 0-50 cm, attaining 100% or just below during most months. At 51–100 cm, however, the differences between sites were more pronounced, with Thomsons and Brickpits achieving close to 100% vegetational density in July, August and September in contrast to <40% at The Mere. At 101–150 cm, the mean % vegetational density was just below 50% at Thomsons (47%) and Brickpits (48%), compared with only 1% at The Mere. A positive correlation was calculated between the number of *E. argoteles* larvae recorded and mean % vegetation density at 0–50 cm ($r_s = +0.488$; $P < 0.029$), 51–100 cm ($r_s = +0.596$; $P < 0.006$) and 101–150 cm ($r_s = +0.533$; $P < 0.016$) from ground level.

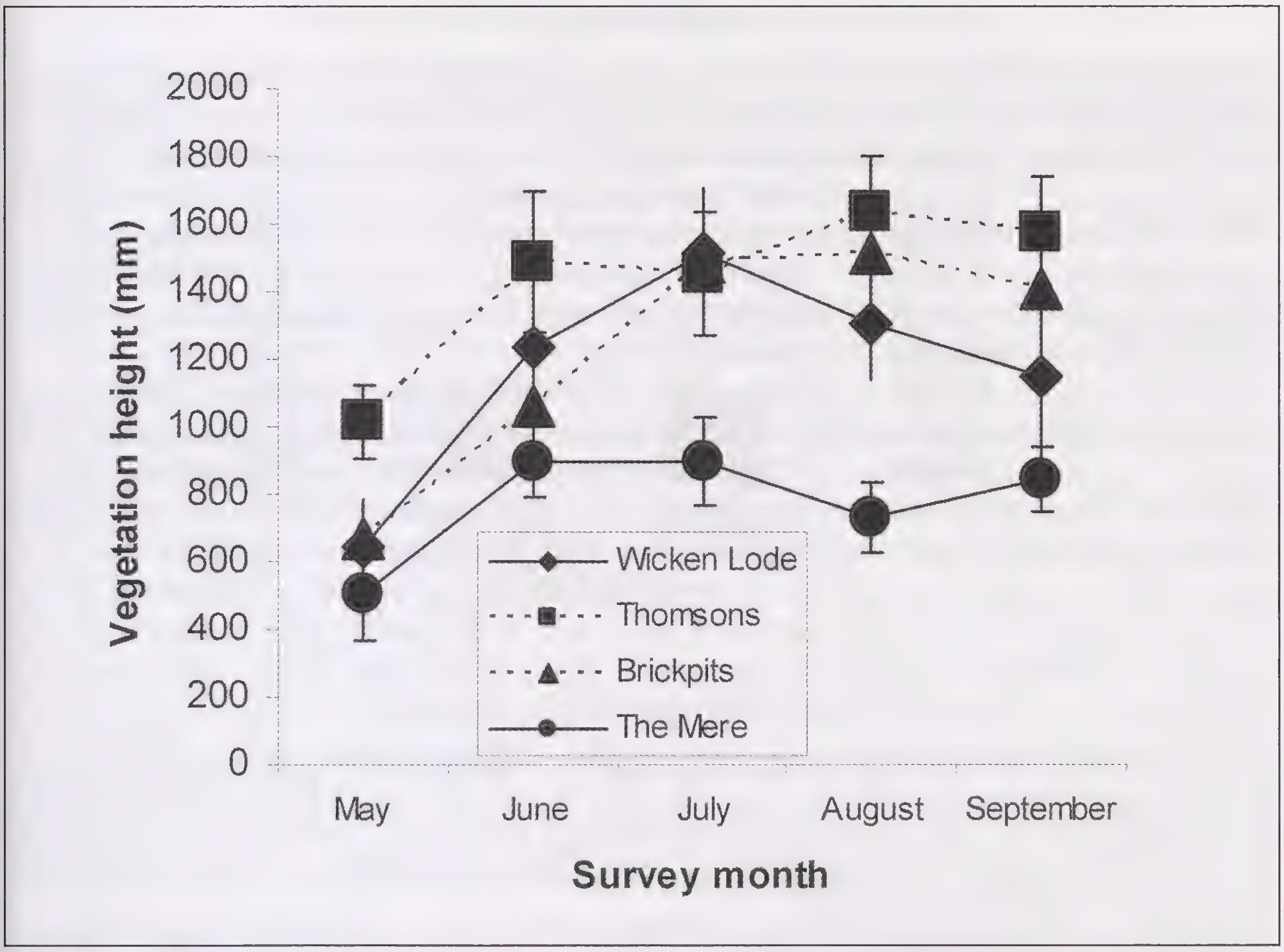

Figure 5. Mean vegetation height at each site over the survey period

Table 2. Mean vertical vegetational density and numbers of *Emmelina* larvae found at Wicken Fen 2007

Site	% Mean vegetation density (±s. e.)	No. of Emmelina larvae
Wicken Lode		
0-50 cm	99 (±0.46)	2
51–100 cm	76 (±7.6)	13
101–150 cm	36 (±8.0)	7
Thomsons		
0–50 cm	100 (±0.0)	3
51–100 cm	93 (±2.9)	24
101–150 cm	47 (±8.1)	9
Brickpits		
0–50 cm	98 (±1.4)	2
51–100 cm	77 (±9.2)	13
101–150 cm	48 (±9.9)	4
The Mere		
0–50 cm	94 (±2.2)	4
51–100 cm	27 (±5.2)	0
101–150 cm	1 (±0.47)	0

Discussion

The results show that *E. argoteles* breeds continuously between spring and autumn and that the larvae of this species can be found from May to as late as September (Fig. 1). As surveys were conducted monthly it was not possible to detect detailed trends. It appears that a month with high larval abundance was followed by a month with low abundance suggesting that the entire life cycle of *E. argoteles* may be approximately seven to eight weeks in duration. The fact that by far the highest numbers of larvae were recorded during mid July indicates that this is the optimum time of year to search for *E. argoteles* larvae.

Emmelina argoteles was recorded at all of the sites surveyed and it is probable that the species is present across large areas of Wicken Fen. The highest abundance of *E. argoteles* larvae was recorded at Thomsons, the site with the lowest abundance of the food plant, *C. sepium*. As the site with the second highest level of larval abundance (Wicken Lode) was also the site with the highest abundance of *C. sepium*, it is reasonable to assume that levels of larval abundance can be better attributed to the management and vegetation structure at a site than simply the presence of the foodplant. Thomsons consists of an area of fenland with tall, dense vegetation, cut on a three-year rotation during July/August and it was last cut in 2005. It is probable that the lack of management over the past two years has been to the benefit of *E. argoteles*. Thomsons was by far the best site for the species in May, indicating that the species may have favoured over-wintering in this area, before laying its eggs at the site in the spring. It is possible that the dense vegetation at the site provided favourable conditions for hibernation.

The lowest abundance of *E. argoteles* larvae was recorded at The Mere, with no larvae recorded until September. In contrast to Thomsons and the other survey sites, the vegetation at The Mere was relatively short and sparse and the site was extensively grazed by Highland cattle. It is possible that the grazing here was detrimental to *E. argoteles*, but it may also be that the environmental conditions and resulting vegetation structure were not suitable for the species, although the site did support a high abundance of *C. sepium*. It is interesting that larvae were only recorded at The Mere in September, indicating that the species either colonised or became more abundant at the site towards the end of the season.

The majority of *Emmelina* larvae recorded were relatively small, suggesting that the abundance of larvae declines as they mature or that they disperse in search of pupation sites. Small larvae, however, are also difficult to find, especially as they tend to be located within the unopened terminal leaves of *C. sepium*. There may also be a considerable rate of mortality throughout the larval stadia. Virtually all *Emmelina* larvae were recorded on *C. sepium* leaves, indicating that this is their favoured part of the plant on which to feed. The fact that smaller larvae were found within fresh unopened leaves may be due to their preference for younger growth or as a means of affording themselves a degree of protection from predators. *Emmelina* ova were laid on the underside of relatively large, open *C. sepium* leaves, either singly or in clusters of between three and six, and tend to be located close to the veins of the leaf (Ringwood, Roscoe & Higgott, 2008). Consequently, it appears that the freshly hatched larvae purposefully migrate to the terminal unopened leaves to feed.

The height at which larvae were found is important in determining their requirements in terms of vegetation structure. The larvae tended to occur relatively high in the foliage and therefore tall vegetation (50 to 100 cm) is required during the summer months. This may help to explain why larvae were more prevalent at Thomsons than at The Mere.

Habitat management recommendations

The survey results showed that *E. argoteles* preferred tall, dense fenland vegetation that is relatively undisturbed and habitat management at sites where the species occurs should strive to achieve this. The following management recommendations are made for sites where *E. argoteles* has been recorded.

(i) Keep management to the minimum necessary to avoid succession to (i) scrub (ii) carr.

(ii) Where cutting is necessary, cut on a three-year rotation, ensuring either that no more than half of the area is cut in any one year or that there are suitable uncut areas adjacent to the site.

(iii) Do not cut between early May and mid September, as this is when larvae are feeding and tall vegetation containing *C. sepium* is required.

(iv) Ideally, cut in October and leave cuttings on site. *E. argoteles* will be in the adult stage at this time of year and should be able to disperse to suitable hibernation sites subsequent to cutting.

Proposals for further research

It is recommended that further surveys should be conducted at Wicken Fen to determine whether the species is more widely distributed than was determined during this project. Surveys should be conducted to record fluctuations in abundance in response to site management and environmental conditions. In addition, the wider geographical distribution of *E. argoteles* across Britain needs to be ascertained. This is fundamental to determining the conservation status of the species in Britain and how specialised it is with regard to habitat requirements. Early indications are that it may be localised to the fens of Cambridgeshire as the only other site where the species has been recorded is Chippenham Fen (Ringwood, Roscoe & Higgott, 2008), but the collection of further data is required. Larvae and ova of *Emmelina* can be readily found and it is suggested that searching for these within any damp areas where *C. sepium* grows be encouraged amongst lepidopterists and the wider conservation community. The species is easy to rear through from ovum or larva and any interested amateur can do this, but a level of expertise is required for the dissections.

The external differences between *E. argoteles* and *E. monodactyla* are subtle and further research into all life-cycle stages may provide details that would enable identification without dissection. For example, a critical examination of pupal characteristics may provide details of external features that can be used to differentiate between the two species. It may also be possible to develop techniques to identify differences in male genitalia externally, by examining anaesthetised specimens under a microscope. This will prevent unnecessary fatalities of what could be a rare British species and will also make identification more straightforward.

Parasitism and/or predation most probably contributed to the lower numbers of later instar larvae that were found. There were, however, no instances of larval parasitism observed when breeding field-collected *Emmelina* larvae through to maturity. Research into parasitism and/or predation of the immature stages will be necessary at some stage in order to achieve a better understanding of the population dynamics of *E. argoteles*.

Data are required on the preferred pupation site(s) of *E. argoteles* and also on the conditions necessary for hibernation. There is still much to understand about the reasons why the species is apparently restricted to fenland/damp areas where

C. sepium grows, whilst *E. monodactyla* is widespread. There seems to be a life cycle, habitat or environmental necessity, other than the presence of *C. sepium*, which is restricting the distribution of *E. argoteles*. The project discovered much about the habitat and conservation requirements of *E. argoteles*, but there are still questions left to be answered.

Acknowledgements

The authors would like to express their gratitude to SITA Trust (via the Landfill Communities Fund) and the British Entomological and Natural History Society for providing funding for this research. Carol Laidlaw, Conservation Grazing Warden at Wicken Fen and Stuart Warrington, Regional Nature Conservation Advisor for the National Trust, gave of both their time and knowledge to help inform the project as to the current site management being conducted at Wicken Fen and its rationale. All staff at Wicken Fen were supportive of the project and offered use of their facilities. Members of the Cambridgeshire and Essex branch of Butterfly Conservation were also very supportive. Colin Hart trained the authors to identify larvae of *Emmelina* and helped to confirm that *E. argoteles* was breeding at Wicken Fen. Brian Goodey's work on dissections has provided valuable reference material. Volunteers from Butterfly Conservation and local lepidopterists braved the weather to help search for larvae at both Wicken Fen and further afield. Their assistance was greatly appreciated and particular thanks go to Vince Lea and James McGill.

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SHORT COMMUNICATIONS

Are birds a cause of bumblebee decline in Britain? – On 9th April 2008 I was asked to investigate an area of scrub willow at Oare gravel pits, near Faversham, Kent, where a large number of bumblebees had apparently been found dead on the ground. A representative sample of dead bumblebees (50) was given to me, the majority of which appeared to be *Bombus terrestris* (L.). so far as I could tell. The remaining individual was confirmed as *Bombus lucorum* (L.). All of the bumblebees had been badly mutilated in some way and so it was assumed that the bees had been killed by predators rather than dying from unnatural causes. The majority (78%) had been cut in two, severed at the waist and their whole abdomen removed. The remaining bees (22%) appeared intact, but either the dorsal or the ventral surface of the membrane separating the first and second abdominal segments had been slit open and the entire internal body contents removed. As the pattern of abdominal banding and genitalia are essential to separate *terrestris* from *lucorum* it is best to assume both species were involved. This slicing action is typical of birds rather than mammals. Two of the bees were even alive despite being abdomen-less.

A visit to the area was made on the following day and just under 200 bumblebee queen corpses were counted (Fig. 1). Dead bumblebees were found over an area of 150m × 100m although a larger area (c.3 ×) was surveyed. Most of the bumblebees were found in the open amongst the short turf and mosses in front of a series, almost a line, of grey willow trees (*Salix cinerea* ssp. *oleifolia*). It was assumed that the bumblebees had been intercepted as they visited the bushes to collect nectar and/or pollen.

Although several bird species are known as bumblebee predators the most likely species is the great tit *Parus major* as it has been reported attacking bumblebees foraging on lime, particularly *B. terrestris*/*lucorum* (Alford, 1975; Benton, 2006) and was caught in mist nets in the vicinity at the time of the attacks (no shrikes were caught). What is different here is that queen bumblebees were attacked rather than

Fig. 1. Corpses of bumblebees, Oare, Kent, 9 April 2008.

Table 1 *Bombus terrestris/lucorum* queens collected from Oare, Kent, 9 April 2008

Observation	No. of individual queens
Dead, entire abdomen removed	37
Dead, abdomen empty, cut/pecked open	10
Alive, abdomen-less bees	2

workers and the level of predation locally was very high. The great tit is also known to attack bumblebees in their overwintering sites, particularly those parasitised by the nematode *Sphaerularia bombi* Dufour (Bols, 1939). The presence of this endoparasite was considered but not looked for simply because of the age and condition of the corpses. More than 70% were infested with external mites, but the loads were not considered excessively detrimental though by the time the corpses were collected it was likely that many of the mites had already dispersed.

The effect of so much predation in one area must have had a great impact on the viability of *B.terrestris/lucorum* populations in the surrounding region. A recent study in the UK has shown that bumblebee nest density (all species surveyed) varies from 20–37 nests/ha along woodland edges to 11–15 nests/ha in woodland and grassland (Osborne *et al*., 2007). Thus 10–40ha of land (on a per species basis) in the immediate vicinity may have become entirely devoid of nests of these two bumblebee species as a result of this predation episode. Goulson *et al*. (2005) reviewed the main causes of rarity in bumblebees across Europe and concluded that the decline was largely attributable to the loss of unimproved flower-rich grasslands. Although this largely explains the large scale declines in bumblebees across Britain, stochastic events such as bird predation described here may also contribute to local extinctions. If such species are not well established locally this could lead to a more permanent loss of bumblebees in the area. Luckily, both species occur in high numbers in this part of Kent and recolonisation should take place in the following spring. No further visits were made to the area as it was on private land but it would be interesting to know whether the predation of bumblebees continues over a longer period, such as successive years and whether less common bumblebee species are preyed upon.

Of course it is equally plausible that bumblebee nest density is determined more by the number of suitable nesting sites in an area than by the number of emerging queens. So far as I know there are no estimates of the potential number of nesting sites in an area compared with the numbers of established nests during a given year. It is also possible that the removal of so many queens may leave an appreciable number of nesting sites vacant locally for later-emerging bumblebee species to occupy, assuming the locations are suitable for them. – JOHN BADMIN, Coppice Place, Perry Wood, Selling, Kent ME13 9RP.

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The beetle fauna of the Mid-Churnet Valley, Staffordshire – a correction. – Mark Webb's and the late Maurice Waterhouse's article on the rich insect fauna of this interesting area of north Staffordshire referred to the discovery of the rare soldier beetle *Cantharis fusca* L. (Cantharidae), a species otherwise unknown from the west Midlands region (Alexander, 2003). A voucher for this record was subsequently sought and proved to be the nationally scarce *Ancistronycha abdominalis* Fabr., a species well-known from this general area. I understand from the lead author that the article contains other misidentifications which need to be recorded in due course. – KEITH N. A. ALEXANDER, 59 Sweetbrier Lane, Heavitree, Exeter EX1 3AQ.

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BENHS FIELD MEETINGS

Broxhead Warren & Common & Bordon Inclosure, Bordon, Hampshire, 2 August 2008

Leader: **Stephen Miles**. – Broxhead Warren was visited by a party of five, all members of one or more of the following organisations, the Alton Natural History Society, the British Entomological and Natural History Society and the Hampshire and Isle of Wight Wildlife Trust. The habitat is former heathland now covered in scrub and small trees interspersed with large areas of bare sandy ground. The weather conditions were not ideal with scattered showers and occasional sunshine. Nevertheless two meadow brown, one gatekeeper and three speckled wood butterflies were seen as well as one Silver Y moth. Other insects present were the common wasp, *Vespula vulgaris* (L.) and the hoverflies *Episyrphus balteatus* (De Geer), *Meliscaeva cinctella* (Zetterstedt) and *Eristalis intricarius* (L.). A number of different solitary bee and wasp species are known to nest in the bare ground here but none was seen due to the poor weather. A southern hawker dragonfly *Aeshna cyanea* (L.) put in a brief appearance and a speckled bush-cricket *Leptophyes punctatissima* (Bosc) was also seen. Fly agaric *Amanita muscaria*, a mycorrhizal toadstool, which is associated with the roots of birch and pine trees was also growing here, together with birch polypore *Piptoporus betulinus*, a bracket fungus which causes a brown-rot in the wood of dead or dying birch trees. The most interesting plant known from and again seen in the area on the edge of some of the bare sandy tracks was Coral Necklace, *Illecebrum verticillatum*. This is thought to have spread here recently by being present in the tank tracks and wheel treads of the military vehicles that have used the site. Finally a green woodpecker was seen, a common bird in these heathland areas wherever there are small areas of bare ground and grassland.

We were most fortunate to have the presence on the field meeting of Dom Collins, the national expert on thrips (Thysanoptera). These are minute, slender-bodied insects with two pairs of narrow, fringed wings, frequently but not exclusively found in flowers. Their eggs are usually laid on or in plant tissues, many species' females possessing saw-like ovipositors.

Here on Broxhead Warren, Dom recorded: *Aeolothrips ericae* Bagnall, a widespread species (albeit with a local distribution within that range) that is

particularly associated with plants in the Ericaceae and Fabaceae; *Sericothrips staphylinus* Haliday, a specialist on *Ulex* and common across Britain; *Taeniothrips picipes* (Zetterstedt), locally distributed across Britain, found in the flowers of many herbs; *Thrips flavus* Schrank, a common and widespread flower thrips that is found right across the Palaearctic, it is easily found in flowers in high summer with populations at their peak in late July; *Thrips major* Uzel, found in the flowers of a wide range of plant species, but particularly in the Rosaceae, widespread and common across Britain, apart from northern Scotland, and the most common species normally encountered. Finally *Thrips vulgatissimus* Haliday, the one female found on *Erica cinerea* was a new county record. Dom noted that *T. vulgatissimus* is common and widespread and found in the flowers of many plants but is particularly associated with white flowers including a real fondness for umbellifers from which it can be collected in large numbers. The fact that this is apparently a new county record surprised him; the record is not of any geographical significance and merely reflects an anomalous gap in recording in the South East of England.

After a successful pub lunch on the patio of the nearby Woodlands Inn the party visited the central Broxhead Common SSSI part of the Wealden Heaths II Special Protection Area. A pair of stonechats was seen and separately a buzzard was observed overflying the area. Two adult True Lover's Knot, *Lycophotia porphyrea* (D. & S.) were found roosting among the larval foodplant, ling, *Calluna vulgaris*. An example of Roesel's bush cricket *Metrioptera roeselii* (Hagenbach) was found and confirmed by David Lonsdale as was the presence of harlequin ladybird, *Harmonia axyridis* (Pallas). The typical heathland wasp species *Ammophila pubescens* Curtis and *A. sabulosa* (L.), as well as *Cerceris arenaria* (L.) and the two solitary bees *Andrena fuscipes* (Kirby) and its cuckoo *Nomada rufipes* Fabr. were also observed.

The presence of a small pond on this site enabled the occurrence of the common blue damselfly, *Enallagma cyathigerum* (Charpentier) and the broad-bodied chaser, *Libellula depressa* L. to be observed.

Dom Collins found *Ceratothrips ericae* (Haliday), a heather specialist, *Odontothrips ignobilis* Bagnall, a specialist on *Ulex* spp., which has been recorded from the Isles of Scilly through to Cumbria, but is not collected very often and Hampshire is one of only 13 counties from which it has been recorded in England and Wales; and *T. flavus*.

Only three members of the party including the leader remained to visit the Borden Inclosure. The remainder of the stump of a large beech tree was admired for the deadwood habitats that it was providing for many organisms, including a yellow slime mould. David Lonsdale noted that these organisms are giant multinucleate amoebae, rather than true fungi. They form a streaming protoplasm, digesting dead plant matter and eventually re-assembling themselves into fungus-like fruit bodies, often brilliantly coloured. The small pinkish fruit bodies of coral spot *Nectria cinnabarina* were also found on dead branches nearby. This is an ascomycete, which grows on the branches of a wide range of trees and shrubs, sometimes as a weak parasite.

David thought that the large size of one spreading oak tree and two remaining magnificent beech trees might be sufficient to have them placed on the Ancient Tree Forum register of veteran, ancient and notable trees.

Thanks go to the Chairman of the Longmoor Conservation Group, representing Defence Estates for permission to hold this meeting.

Roots & Shoots, Walnut Tree Walk, Lambeth, London, 13 September 2008

Leaders: **Paul Waring, Toyin Solanke and David Perkins**. – This was a diverse field meeting comprising operation of two light-traps to sample the moths on site and an indoor session in which Toyin Solanke provided an illustrated geological history of the Borough of Lambeth in which she lives and the legacy of moths in the fossil record. Toyin also sang a rap song to summarise and convey the key points. This is surely the first BENHS field meeting to feature rap music!

The evening commenced with the arrival at the start time of 19.00h of over fifty people, including a number of children, mainly from Lambeth. The event had been advertised locally in advance by site manager David Perkins using a few strategically placed posters and an e-mail to the "Friends of Roots & Shoots" subscription-based group, as well as inclusion in the BENHS field meetings programme.

Once assembled, our first job was to put out the ten wine-ropes we had made freshly for the occasion, explaining that any residents could easily and cheaply use this technique. These were draped over branches of various trees that surround the rough grassland in the wildlife garden maintained by the Roots & Shoots horticultural training centre. The design and workings of a light-trap were explained and a simplified trap placed on open grassland by the trees and shrubs. A Skinner-type wooden light trap belonging to Roots & Shoots and fitted with a 15W actinic fluorescent light-tube was operated in a nursery area on a hard-standing and screened from the other light-trap by a hedgerow and various buildings. The night was clear, cool and dry and a bright full moon rose soon after dark while we were standing around the traps discussing light-trap designs. The trap with the blended bulb captured sixteen moths of six species over the course of the night. These were Large Yellow Underwing *Noctua pronuba* (5 individuals), Lesser Yellow Underwing *Noctua comes* (2), Lesser Broad-bordered Yellow Underwing *Noctua janthe* (1), Vine's Rustic *Hoplodrina ambigua* (2), Square-spot Rustic *Xestia xanthographa* (2) and Willow Beauty *Peribatodes rhomboidaria* (4). The actinic trap captured thirteen moths of seven species, adding Silver Y *Autographa gamma* (1), Pale Mottled Willow *Caradrina clavipalpis* (3) and Marbled Beauty *Cryphia domestica* (1) to the list for the night. However, most of these moths arrived after the meeting closed. Anticipating this, the leader had brought along a selection of live moths and these were passed around at the start of the indoor session for everyone to see and these exhibits were particularly popular with the children.

A fine hot vegetarian meal and hot drinks were provided to warm everyone up while lots of questions were asked informally and we concluded the indoor session with an ensemble sing-song. We were so involved with all of this that we did not get around to checking any of the wine-ropes before 22.00h, by which time any of the moths that they attracted had departed! We finished with a vote of thanks to our hosts at Roots & Shoots and all those, including the catering volunteers, who had contributed to this interesting and enjoyable event. The records have been entered on the Roots & Shoots website and forwarded to Colin Plant as Moth Recorder for the London area, and to the National Moth Recording Scheme.

Otmoor, Oxfordshire, 27 September 2008

Leader: **Paul Waring**. – The leader was joined by six members and friends for the afternoon session, meeting at 14.00h at the RSPB car park at the foot of the hill up to Beckley. An additional two friends joined us for the night session. The afternoon was warm and sunny but with an autumnal feel, following an early morning mist. The

hawthorn berries and rose hips were red in the hedgerows but the foliage on the trees and shrubs was still predominantly green and worth beating. The grassy verges of the lane were uncut, with seeding willowherbs and burdocks and the white flowers of hedge bindweed *Calystegia sepium* (L.). The hedges of Otmoor lane are amongst the tallest remaining in Oxfordshire, with some of the shrubs 3–5m tall. It is pleasing to report that the willows and other trees at the south end of the Roman road across Otmoor are regrowing after their recent pollarding – the first cutting the leader can recall in many years.

Once we had all assembled, Eric Philp and Kevin Chuter got straight down to sampling the dyke system with pond nets. They began with the recently installed ditch across the western portion of Otmoor, which was a cereal field in the late 1970s, and part of the agricultural set-aside scheme in the late 1980s. It is now cattle-grazed permanent grassland and reedy lagoons. All of us watched as the first pond net samples brought up a selection of thickset dragonfly nymphs of the genus *Libellula*, back-swimmers *Notonecta glauca* L., pond snails such as *Limnaea stagnalis* (L.) and *Planorbis planorbis* (L.), immature pond-skaters of the genus *Gerris* – all as expected. Also found were numbers of the Saucer Bug *Ilyocoris cimicoides* (L.) – at the rate of about half a dozen individuals per net, repeatedly. The leader was particularly pleased to see the saucer bug – as an old friend upon which he conducted experiments to investigate optimal foraging behaviour while a zoology undergraduate at the University of Oxford in the late 1970s. At that time the saucer bug was considered rather local in Oxfordshire. Eric Philp, on a rare entomological visit outside his home county of Kent, commented that in Kent the bug is often numerous and very much associated with unpolluted ditches with low flow rates.

The rest of us left Eric and Kevin to sampling the aquatic habitats and set off across the "moor" to St Joseph's Stone field. Female craneflies were laying eggs in soft ground by the new dyke and these were identified by both Martin Harvey and Eric Philp as *Tipula paludosa* Meig. A grey heron flew up from one of the long established ditches as we approached and we flushed a snipe which rocketed off chattering. Using his binoculars David Hastings spotted from some distance a female Southern Hawker dragonfly *Aeshna cyanea* (Müller) laying eggs on stems of a small reed *Glyceria maxima* (Hart.) and a pair of these dragonflies in cop. We also noted several Common Darter *Sympetrum striolatum* (Charp.) on the wing.Whirligig beetles were active on the surface of the dykes and lagoons, on one of which we saw a mute swan and three grey cygnets. A brown hare moved off from its form in open ground. When we reached the hedgerows on the north side of the field we saw our first butterflies of the event, a Small Tortoiseshell *Aglais urticae* (L.), which had been rather scarce in Oxfordshire this summer, and a Comma *Polygonia c-album* (L.) sunning on a hawthorn bush. The leader began beating the hawthorns along the banks of the River Ray, determined to show Mary Elford some caterpillars, as well as demonstrating the technique. This was Mary's first field meeting out with the BENHS. Large numbers of caddis flies were dislodged by the beating and several mating pairs ended up on the beating tray. Moth caterpillars proved much more elusive, so it was with some relief that one was eventually obtained – a final instar larva of the Brimstone moth *Opisthograptis luteolata* (L.) beaten from common hawthorn. This proved to be the only caterpillar of the day. Martin Harvey obtained several Long-winged Coneheads *Conocephalus discolor* (Thunb.), also identified by Eric Philp, by sweeping in the same area. A Cetti's warbler called with a loud explosive twitter from the hawthorn scrub. A marsh harrier was spotted hunting the open ground some distance from us. Then at 17.38h a barn owl came flying into view

within 50m of us, quartering one of the small fields just beyond the bend in the River Ray.

A hot air balloon adorned with a beautiful model advertising Triumph bras disturbed a flock of widgeon which took off whistling from a shallow water lagoon! We viewed the ducks through silhouetted burdock and cow parsley on the bank of the river while a kingfisher sped up the river, screaming loudly, and Dark Bush Crickets *Pholidoptera griseoaptera* (DeGeer) began calling.

The afternoon was beginning to cool down as we returned across the main field, to find Eric and Kevin still sampling the dykes from the banks. They reported that the older, established dyke around the "moor" had certainly produced more species, of greater interest, than the newly installed dyke across the moor. We all examined a series of pots containing some of the more interesting finds, including a large diving beetle *Dytiscus semisulcatus* (Müller) before Eric and Kevin packed away their gear and departed on their drive back to their homes in Kent. A couple of weeks later Eric supplied a list of the invertebrates recorded, which included Coleoptera (29 species), Hemiptera (20 spp.), Mollusca (8 spp.), as well as Isopoda (*Asellus aquaticus* (L.) and *Philoscia muscorum* (Scop.)), Diplopoda (*Tachypodoiulus niger* (L.)), and the galls of three wasps *Neuroterus albipes* (Schenck), *N. numismalis* (Geoff.) and *N. quercusbaccarum* (L.). His comment was that none of the species he found was unexpected or rare but that there was a good range of species and good numbers. He also reported finding a Smooth Newt *Triturus vulgaris* L.

The rest of us then gathered around the leader's portable gas stove and ate a range of sandwiches, hot soups from thermos flasks and such and chatted about the evening session. We were soon joined by Ron Louch and Jason Gosling who wished to operate their Robinson light-trap and generator in the same spot as on the previous BENHS field meetings on Otmoor, namely along the dyke bank several hundred metres west of the pump-house. The leader deployed one Robinson trap down by the new dyke, and another along the wooded top of the dyke bank, both operated from the mains supply at the pump-house, as on previous meetings. The great joy of this was no noise from generators, Ron's being far enough away that we could not hear it. The leader also set up an actinic trap along the dyke bank, about half way between his Robinson traps and Ron's. This was by some elms, in the hope of detecting the Dusky Lemon Sallow moth *Xanthia gilvago* (D.&S.), although we ended up with a negative result for this species. Martin Harvey and his son Dominic took their traps across the main RSPB field to sample the edges of the recently established reed-beds by the new lagoons because a major aim of this meeting was to continue monitoring the species and numbers of wainscot moths and other wetland species for which the RSPB have created so much apparently suitable habitat in the last decade.

By dusk the air temperature was 5°C, dead calm and a light mist was forming, so we knew we were in for a cool night. It was therefore particularly pleasing to see a stunning freshly emerged Merveille Du Jour *Dichonia aprilina* (L.) in Ron's light trap by 20.05h. The light mist lasted until at least 22.30h but by 22.00h we had quite a list of moths between our various traps, including Beaded Chestnut *Agrochola lychnidis* (D.&S.), Brown-spot Pinion *A. litura* (L.), Brick *A. circellaris* (Hufn.), Grey Shoulder-knot *Lithophane ornitopus* (Hufn.), Sallow *Xanthia icteritia* (Hufn.), Black Rustic *Aporophyla nigra* (Haw.), Canary-shouldered Thorn *Ennomos alniaria* (L.), Brindled Green *Dryobotodes eremita* (Fabr.), Frosted Orange *Gortyna flavago* (D.&S.), Bulrush Wainscot *Nonagria typhae* (Thunb.) and various species which are more frequently trapped. Ron and Jason stayed with their trap until departing at

midnight, so we knew all the species they recorded had flown in the early part of the night.

It was a foggy morning, with visibility down to about 10m when the rest of us got up at 07.00h from our sleep in cars and tents to start inspecting the catches in the traps. Martin and Dominic had camped near their traps and at 05.30h had noted a largish moth, probably an Angle Shades *Phlogophora meticulosa* (L.), flying around one of the lights. Their catches added two Large Wainscot *Rhizedra lutosa* (Hbn.) to our list for the night. This species was evidently either not flying in numbers on this date or was deterred by the weather because these were the only two individuals we saw.

We went through the catches together and managed to reach a total of 28 species of macro-moths amongst our six light-traps despite the challenging weather conditions during the night. We then had breakfast as the fog slowly began to clear. As usual at this site, it was with some reluctance that we departed for our various drives homeward.

Before the leader drove home to Peterborough he had arranged to visit his fellow moth-man, friend of thirty-five years standing, and BENHS member Charlie Gibson, who was suffering from terminal leukaemia at his home in the nearby Oxfordshire village of Wolvercote. Overnight Charlie had operated his Robinson trap on his balcony overlooking Port Meadow, the ditches and riverside portions of which share similarities with Otmoor, so the catch provided an interesting comparison. As on Otmoor, Charlie's catch included the Black Rustic, a species which we had both observed become more numerous in Oxfordshire since our first moth-trapping sessions together in about 1972. Charlie commented that he also trapped the occasional Bulrush Wainscot and Large Wainscot flying around Port Meadow. The following Sunday, 5th October, Charlie died, while the leader was on a mothing trip to Kenya. Charlie was buried on 13th October in Wytham cemetery with a wreath of flowers in the shape of a hawk-moth, two feet across, laid on the coffin. The memorial service was attended by about two hundred mourners, many connected with his work as an ecological consultant, gifted academic and practical conservationist, at all of which he excelled.

With the above meeting we have now held five BENHS field meetings on Otmoor – on 26 June 2004, 23 July 2005, 11 August 2007, and 23 September 2006 and 27 September 2008. In 2009 no meeting is being held on Otmoor, because the leader is leading three other BENHS field meetings in Oxfordshire, to celebrate thirty years since his first light-trapping on two of the sites, and to celebrate 60 years since two of the three were declared National Nature Reserves. However, the leader expects to be organising another event on Otmoor in 2010.

The leader would like to thank all those who supported this event and made for such good company over camp meals and moth-traps in the evening and morning, and particularly Ellen Lee, a volunteer for the RSPB, who met us at the start of the meeting and opened up the pump-house for our use. The pump-house provided us with a place to inspect the moths in comfort and in case of inclement weather. The leader was particularly pleased when Mary Elford later told him that this event was one of her most enjoyable days of 2008. Copies of this report, and the full list of species from the night, have been supplied to the RSPB, and to Martin Townsend as County Moth Recorder for Oxfordshire.

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Cover photograph: L-album Wainscot *Mythimna l-album* (L.) (Noctuidae), Boughton-under-Blean, Kent, 6.x.2008. (Photo: P.Maton).

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CORD-GRASS PLANTHOPPER *PROKELISIA MARGINATA* (HEMIPTERA: DELPHACIDAE) SWEEPS INTO KENT

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ABSTRACT

The distribution of the recently introduced planthopper *Prokelisia marginata* (van Duzee) in Kent is summarised together with the distribution of its new hostplant, common cord-grass *Spartina anglica*. The impact of this highly vagile delphacid on saltmarsh communities in the UK is briefly discussed.

INTRODUCTION

The *Spartina* planthopper *Prokelisia marginata* (van Duzee) (Fig. 1) was recorded as new to Britain from specimens collected at Fawley and Hythe along the south Hampshire coast in July 2008 (Wilson & Mühlerthaler, 2009). It is a denizen of the eastern seaboard of USA where it feeds on native cord-grass *Spartina alterniflora*. It has been proposed that the planthopper may have been introduced into Europe from America with cord-grass that is frequently used for packaging (Anon, 2008).

OBSERVATIONS

Dr Alan Stewart of the University of Sussex who is conducting research on this species in the UK requested members of the Het Forum to look out for this species in their areas. A quick visit on 13 July 2009 to the Kent Wildlife Trust reserve at Oare Marshes, Faversham, revealed the planthopper was present on *Spartina anglica* in very high numbers, with approximately 20–30 adults and nymphs per sweep. Lots of other individuals were disturbed in the process of sweeping, causing a scattering of individuals to nearby plants, so the total numbers must have been very high, possibly as much as 100,000 in the main bay.

A series of visits to nearby localities confirmed the presence of the planthopper in all large stands of the grass along the north Kent coast from Minnis Bay in the east to near Gravesend in the west (Fig. 2). A brief visit to the Isle of Sheppey showed that *P. marginata* was present by the Kingsferry Bridge (that links the island to the mainland), Ladyhole Point in the west and Shellness National Nature Reserve in the east, though not at Warden Bay in the north-east where the host plant appears to have died out in recent years. A month or so later a visit was made to Pegwell Bay on the east Kent coast where nymphs of a later generation were found in lowish numbers. Nymphs and adults were still present at Oare Marshes on 1 November showing that this insect is capable of progressing through several generations in one year; a factor which may help to explain its rapid spread in this country.

Prokelisia marginata appears to have spread very rapidly along the Kent coast as it was not recorded when a brief survey of the smaller islands in the river Medway was undertaken on 1 July 2007. Travelling in a lightweight dinghy, landings of up to an hour were made at Nor Marsh, Burntwick Island, and Slayhills Marsh which support, or are mainly composed of cord-grass and may in the case of Slayhills Marsh be semi-submerged at high tide. It is possible that the planthopper may have been overlooked and not recorded on this occasion if only small nymphs had been present. In the USA, the planthopper is recognised as an active flyer between sites and macropters have

Fig. 1. *Prokelisia marginata* on *Spartina anglica* at Oare Marshes KWT Reserve, Kent, October 2009.

been recorded in light-traps 100km off shore in the Gulf of Mexico (D. Strong, *pers.comm.*).

The distribution of *P. marginata* and its host plant are shown in Fig. 2. The latest records of *S. anglica* were kindly provided by Eric Philp from his forthcoming atlas of the Kent flora. The distribution of the plant today is very similar to that recorded in Philp (1982) though the plant has disappeared from several localities along the north Kent coast. The status of *Spartina* in Kent has undergone some remarkable changes over the past century. Small cord-grass *Spartina maritima*, a presumed native, referred to as *S. stricta* Roth in the flora of Hanbury & Marshall (1899) was stated to be "Native. Muddy sea-shores; rare and very local". A mere five localities were listed; Oare Creek, Harty Ferry, between Whitstable and Seasalter, and Queenborough. Dr Goodenough (*loc. sit.*) rated it as 'plentiful on Sheppey Isle'. The species account is remarkably brief compared with that of many common species and it is probably significant that it was not recorded from Pegwell Bay along the east coast. At about this time, *S. anglica* was recorded for the first time as a novel

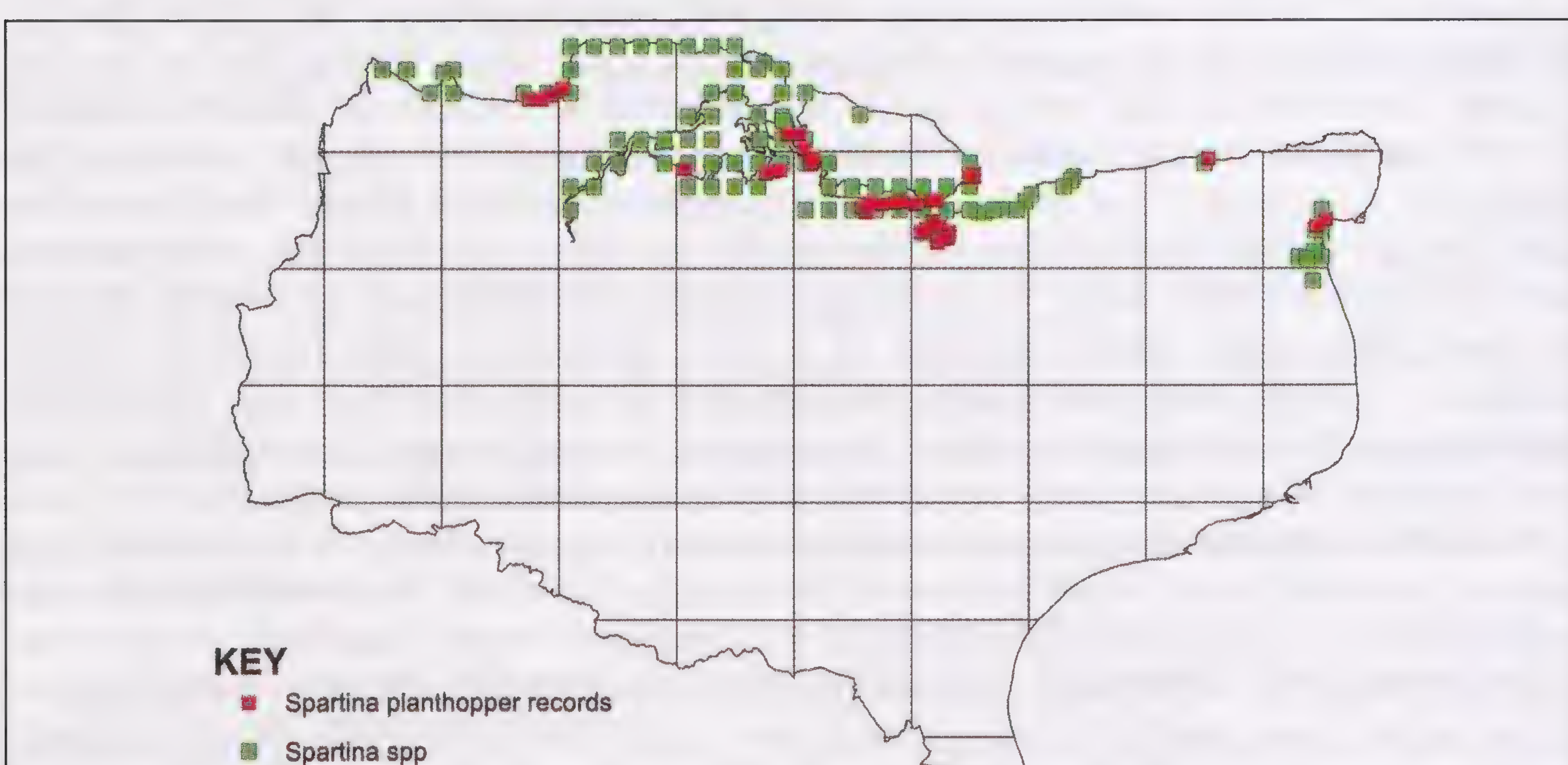

Fig. 2. The distribution of *Prokelisia marginata* and its host plant in Kent 2009. Prepared from data held at Kent & Medway Biological Records Centre.

amphidiploid species derived from the sterile primary hybrid *S. townsendii* (*S. alterniflora* × *S. maritima*). Viable seed from this plant enabled it to spread naturally along the south coast of England and to reach the north coast of France (Cope & Gray, 2009). Cuttings and seed of S. *anglica* were also later actively transferred to new localities in the UK in order to stabilise soft mud and reduce coastal erosion. The spread and dominance of *S. anglica* was such that by 1982, *S. maritima* was known from only one site in Kent, where it has since died out (Philp, 1982).

Discussion

Common cord-grass *S. anglica* has been successfully planted around the world but in certain areas it has tended to dominate local saltmarsh communities to such an extent that control measures have had to be undertaken. For example, in North America, a biological approach to controlling the spread of *S. anglica* has been investigated using *Prokelisia* spp. planthoppers. Very high planthopper densities resulted in more than 90% plant death in glasshouse studies (Wu *et al.*, 1999). Follow-up tests with *S. anglica* in the field were not conducted. Thus there is a possibility that the planthopper *P. marginata* may have a significant effect on *Spartina* stands here in the U.K as it certainly capable of achieving high densities under natural conditions. Many plants of *S. anglica* in southern Britain (below 53°N) have become infected with ergot fungus *Claviceps purpurea* (Fr.) Tul. which has resulted in loss of sward vigour and die-back (Cope & Gray, 2009). The combination of these two agents may have a synergistic effect on *Spartina* survival, which if true, will undoubtedly have a knock-on effect on the stability, extent and composition of our native saltmarsh communities.

Conclusion

The planthopper *P. marginata* has spread rapidly and widely in Kent, occasionally reaching very high densities. The potential decline of *Spartina* locally as a result of feeding damage caused by the delphacid combined with the deleterious effects of ergot infection may be seen as beneficial in some quarters in the UK, as large stands of *Spartina* have been recorded as interfering with foraging of shorebirds (Goss-Custard *et al.*, 1995), the exclusion of native fish (Gray, Marshall & Newbould, 1991) and other side effects. With this insect's mobility and its ability to reproduce quickly in mind, it is surely necessary to monitor the effects that it is having upon our estuarine ecosystems and processes.

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SHORT COMMUNICATION

The 'Lesser Glow-worm' *Phosphaenus hemipterus* (Coleoptera: Lampyridae) in West Kent. – Since its original discovery in East Sussex in 1868, *Phosphaenus hemipterus* (Goeze) has always been an enigmatic and elusive species. At the time of the writing of the original national Red Data Book for insects (Shirt, 1987) and the subsequent review of scarce and threatened Coleoptera (Hyman & Parsons, 1992), it had not been seen in Britain since 1961, although a single specimen was found in Surrey in 1995 and a colony in Hampshire in 2007 (Horne, 2007). Both of these works accept *P. hemipterus* as a native species, categorised as Endangered, but in the provisional atlas for this group of Coleoptera (Alexander, 2003) it is dismissed as 'probably an accidental introduction'. This assessment does not seem to fit the facts, as the historic records, sometimes involving substantial numbers and repeat occurrences over several years, are definitely clustered in East Sussex and around Southampton, and the recent Hampshire discovery is also from near Southampton.

On 7 June 2009, I was leading a meeting of the Kent Field Club on Rusthall Common, Tunbridge Wells, when one of the participants, Tony Witts, spotted a strange insect wandering over the bare sandy ground of a path-side bank. He passed this to me for comment, and it immediately brought to mind published illustrations of *P. hemipterus*. Subsequent examination confirmed that it was indeed a male of that species. Fowler (1890) comments that 'the insect has the power of counterfeiting death if disturbed', and it was interesting to observe that when first captured the specimen did exactly that, drawing in its antennae and legs close to its body and curling its head and abdomen inwards as if 'shrivelling up'. Taking it into a darkened room enabled its luminescence to be observed, this taking the form of two tiny but brilliant greenish-white points of light corresponding to the two pale spots on the final abdominal segment.

Although just within West Kent, the new site fits well with the species' historic distribution in East Sussex. The 1961 record mentioned above was from Ashdown Forest, and the commons of Tunbridge Wells are outliers of the same heathland complex. Rusthall Common is an ancient heathland and acid grassland site, now partly overlaid by secondary woodland. Like the adjacent Tunbridge Wells Common, which offers similar habitats, it is marked by prominent sandstone outcrops and associated areas of bare sandy ground. Later visits to the site of capture failed to reveal any further examples, but further efforts will be undertaken in 2010. The original specimen has been deposited in the collection at Tunbridge Wells Museum. – IAN C. BEAVIS, 104 St James' Road, Tunbridge Wells, Kent TN1 2HH.

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RARE BEETLES FROM THE LOWER SOAR VALLEY IN LEICESTERSHIRE AND NOTTINGHAMSHIRE

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ABSTRACT

Sixty species of terrestrial, ground-living beetles with value for nature conservation are listed after over twenty years of extensive sampling of riparian and floodplain wetland habitats in the lower Soar Valley in Leicestershire and Nottinghamshire, an example of a lowland river valley. A further 12 rare species are listed as vagrants. A good number of these species form an ecological group that exploits floodplain marsh with fluctuating water levels. Three rare species of *Calodera*, *C. protensa* Mannerheim, *C. rufescens* Krantz and *C. uliginosa* Erichson are restricted to shallow abandoned channels that lose their surface water early in the spring. Species that exploit exposed fine sediments by the main channel are also well represented, but, in general, this ecological group is more frequently recorded along the larger River Trent.

INTRODUCTION

In recent years there has been a lot of interest in the conservation interest associated with riparian invertebrates (mainly beetles) by upland and piedmont rivers and in particular on shingle banks (Fowles, 1989; Eyre, Luff & Lott, 2000; Hewitt *et al.* 2000; Bates & Sadler, 2004; Bell, Sadler & Drake, 2004; Sadler, Bell & Fowles, 2005; Lott, 2006a; Lott, 2006b, Bates, Bell & Sadler, 2007). Very little work has been published on the invertebrates associated with fine sediments by rivers in lowland catchments, although there is some evidence that they support a distinctive fauna both in this country (Lott, 1999a) and in continental Europe (Gerken *et al.*, 1991).

Between 1991 and 1994 a number of samples of ground-living beetles were taken from 64 sites in the lower Soar Valley for a PhD project aimed at exploring the ecology of terrestrial beetles with riparian and wetland habitats (Lott, 1999b). The sampling method employed hand-collecting and a standard protocol was rigorously applied in order to compare the results from different samples. An identical protocol has also been used to sample beetles at a further 65 sites in the valley both for commissioned projects, such as environmental impact assessments and SSSI monitoring, and for personal interest. Further data on Soar Valley beetles are available from various pitfall-trapping exercises and from collections made from flood refuse. The purpose of this paper is to report records of species of conservation interest generated by all this survey work in a river floodplain that is purely lowland in character and dominated by deposition of fine sediments.

SURVEY AREA

The River Soar is a tributary of the River Trent with a catchment of 1388 sq. km. Much of the solid geology in the catchment is overlain by glacial boulder clay. Consequently, although the average rainfall at around 600 mm per year is lower than most of England and Wales, high levels of surface run-off lead to frequent spates and flooding within the river system. The lower Soar Valley is here defined as the section of river and its floodplain between the confluence of the Soar and the Wreake at Cossington (SK595127) and the confluence of the Soar and the Trent at Lockington

(SK493308) (Fig. 1). This river section is 37 km long, but drops less than 20 metres. Consequently, the gradient is very shallow and the river is naturally very slow-flowing. Furthermore, most of the river is impounded for navigation leading to almost lacustrine conditions except after periods of heavy rain. Main-channel sediments are primarily composed of silt and fine sand. Shingle deposits are very limited and confined to just two stretches of unimpounded river at Cotes and Ratcliffe on Soar (see Fig. 2). Vertical clay banks are also mainly confined to unimpounded stretches. Although these banks are undoubtedly scoured by the river, erosion of bank material is probably not very severe. Old maps provide no evidence that major channel changes have occurred for three hundred years. Nevertheless, large deposits of silt and fine sand, in some cases covering up to half a hectare, are not uncommon below the towpath (see Fig. 3) and these must have accumulated since navigation was introduced to the river at the end of the 18th Century. No doubt much of this silt has been washed into the river as a result of agricultural activity or industrial and residential development. Until recently many of the riverside meadows were intensively grazed and the resulting trampling of the riverbank has resulted in marked modification of riparian habitat. Engineering works for flood alleviation between 1983 and 1991 resulted in the re-profiling of long sections of riverbank (see Fig. 6) and some of these were sampled for beetles.

Floodplain wetlands include field ponds and old river channels. At least some of these old channels are abandoned mediaeval mill leats rather than natural channels. There are also large water bodies arising from gravel excavations, but these have not

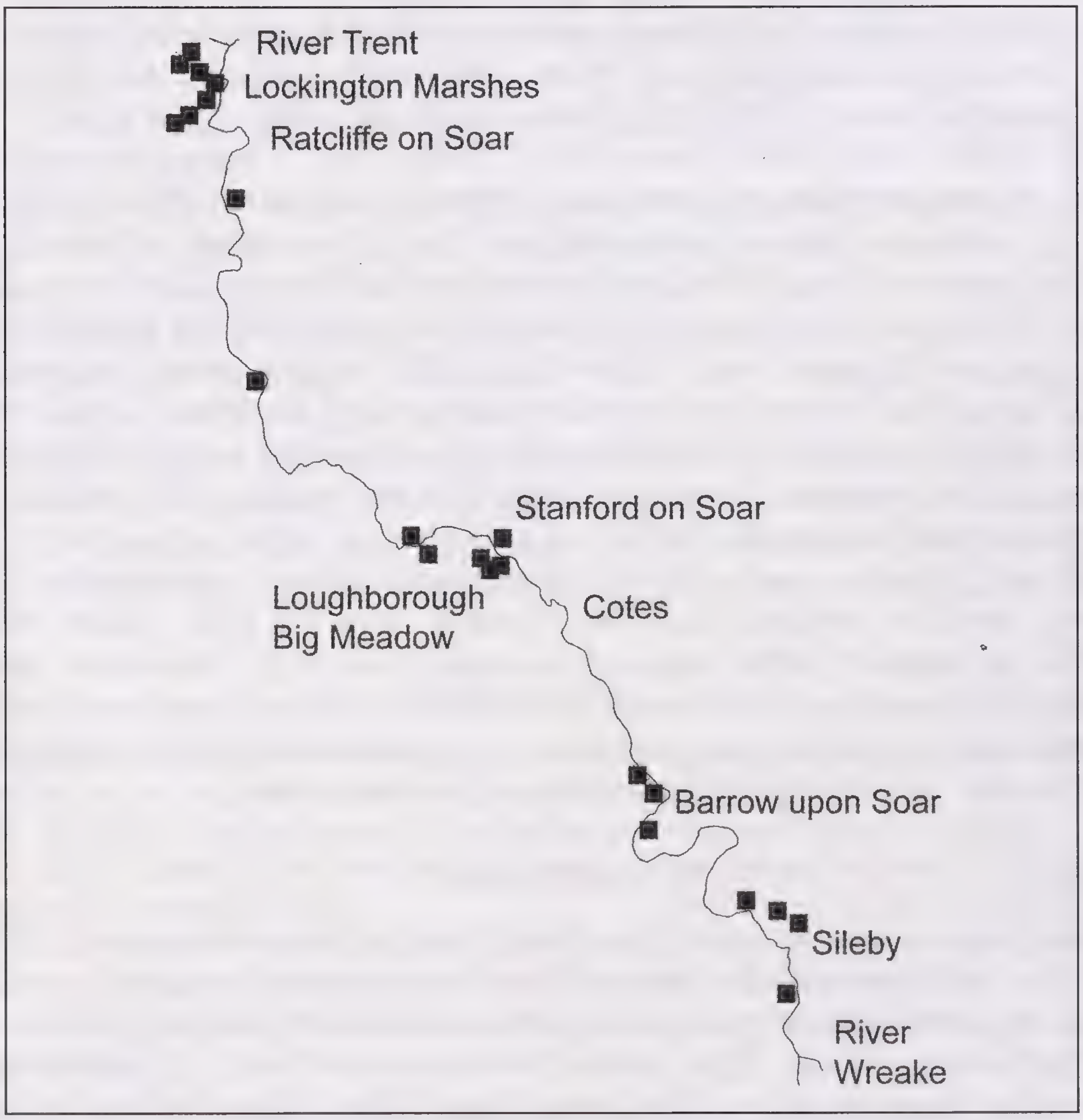

Fig. 1. Schematic map of lower Soar Valley showing locations of important floodplain wetlands. The river section is 37 km long.

Fig. 2 Shingle bank at Cotes (SK553205), 1991.

Fig. 3 Fine sediment on impounded river at Barrow upon Soar (SK571174), 1991.

been surveyed for their beetle fauna. Despite the low gradient of the river and the wide river valley created by larger precursors of the Soar extant in previous interglacial periods, there is no natural fen in the lower Soar Valley and peat deposits are localised. Typically, old channels that flood in the winter dry out in the summer. In grazed and recently excavated sites, the substrate dries out completely, but in undisturbed sites that are shaded or densely vegetated, layers of coarse litter retain moisture throughout the summer.

Survey methods

Sampling of beetles by hand followed the protocol described for ground-searching by Drake *et al.* (2007). This involves searching bare sediment after trampling or splashing, sieving litter and dissecting tussocks for a standard period of time. The sampling area of sites was restricted to habitat where vegetation was directly affected by flooding. In extensive linear habitats each site was limited to a 50 metre strip. Sampling sites included exposed riverine sediment along the main channel, permanent pond margins in the floodplain and old river courses that were flooded in winter and that dried out during the spring or summer. Sampling sites were homogeneous with regard to management, although main-channel habitats tended to be naturally heterogeneous with regard to substrate and vegetation. Three families were targeted: Carabidae, Staphylinidae and Heteroceridae. Other families were also collected on a more casual basis, but were probably under-recorded by comparison with the target taxa. Sampling was initially carried out at monthly intervals between April and September on 30 sites, but thereafter was restricted to between April and June, when the spring breeders that make up the vast majority of the beetle assemblages are most active. Most of the sampling was carried out by the author, but some samples collected for environmental impact assessments were collected by Jon Daws. In all 57 sample sites were on the main channel and 71 sites were in floodplain wetlands. One further site from a spring-fed flush at the side of the valley has not been included in the analysis. Many of the sites included in the PhD project were visited on more than one occasion in order to investigate seasonal and annual variations. Similarly, several sites at Lockington Marshes have been revisited for SSSI monitoring. Two sites at Loughborough Big Meadow have been visited intermittently over a long period between 1991 and 2009 in order to monitor populations of species of particular conservation interest.

Pitfall trapping was carried out between April and September at five of the main-channel sites and two of the floodplain sites in 1992 and 1994 in order to compare sampling methods. In 1996 the Charnwood Wildlife Project group trapped shallow depressions on Bishop's Meadow near Loughborough. Two floodplain sites at Loughborough Big Meadow were trapped in 2009 in order to obtain specimens for DNA analysis. In all cases a series of polypropylene beakers was used with either ethylene glycol or propylene glycol as preservative.

Flood refuse was collected on a casual basis on a number of occasions, mostly in the winter months between 1982 and 1989 from a wide spread of locations. Beetles were extracted with a pooter simply by examining the refuse over a white tray.

Results – the most frequently recorded species

Table 1 lists the species that were hand-collected in the largest number of sample sites. Several species were widespread in both main-channel sites and floodplain sites. In fact, samples from heavily grazed floodplain sites with short turf or trampled bare ground had a species composition that was similar to many main-channel sites.

Table 1. The most widespread species recorded in hand-collected samples

Main channel sites ($n=57$)		Floodplain sites ($n=71$)	
Species	No. sample sites	Species	No. sample sites
Paranchus albipes (Fabr.)	56	*Stenus juno* (Payk.)	58
Carpelimus rivularis (Mot.)	46	*Stenus boops* Ljungh	57
Bembidion tetracolum Say	45	*Atheta graminicola* (Grav.)	50
Stenus boops Ljungh	45	*Bembidion biguttatum* (Fabr.)	50
Bembidion dentellum (Thunb.)	44	*Cercyon convexiusculus* Steph.	49
Bembidion guttula (Fabr.)	44	*Agonum fuliginosum* (Panz.)	45
Bembidion aeneum Germar	43	*Carpelimus rivularisi* (Mot.)	45
Bembidion biguttatum (Fabr.)	42	*Agonum micans* Nicolai	42
Lesteva longoelytrata (Goeze)	42	*Bembidion dentellum* (Thunb.)	42
Bembidion lunulatum (Geoffr.)	41	*Philhygra malleus* (Joy)	42
Coccidula rufa (Herbst)	40	*Mocyta fungi* agg.	39
Carpelimus manchuricus (Bernh.)	39		
Philhygra malleus (Joy)	35		
Elaphrus riparius (L.)	34		
Parocyusa longitarsis (Er.)	34		

Intensive grazing and scouring by floods produced similar beetle assemblages. Similarly, species characteristic of undisturbed floodplain sites occasionally turned up in litter by the more sluggish sections of the main channel.

Species of conservation interest

The 60 species listed below are considered to be of conservation interest by virtue of their national or local rarity or because they are strongly associated with a particular habitat in the river valley. National conservation designations were taken from Hyman & Parsons (1992, 1994). Assessments of local distribution were made using a database of over 65,000 beetle records. Only species likely to have bred in the valley are included. Vagrant species represented by odd individuals are listed in Appendix 1. The recorded hectads and spread of dates are given for each species as well as the respective number of recorded main channel and floodplain sites.

Carabidae

Carabus granulatus L. main channel: 4, floodplain: 1, 1984–2009 SK51,52,42,43
A hygrophilous species of fens and marshes confined locally to the major river valleys.

Blethisa multipunctata (L.) (Fig. 8c), floodplain: 3, 1986–2003 SK42,43
A nationally scarce species formerly not uncommon around reservoirs in Leicestershire, but now restricted to the Soar Valley where it occurs in the Lockington Marshes complex.

Clivina collaris (Herbst), main channel: 17, floodplain: 1, 1991–2006 SK51,52,42,43
Not found away from major rivers locally. Along the Soar most frequently recorded on natural riverbanks that are inaccessible to grazing stock. Also found on the Trent.

Fig. 4 Undisturbed fluctuating marsh at Loughborough Big Meadow (SK541216), 1991.

Fig. 5 Exposed fine sediments by unimpounded river at Cotes (SK553206), 1991.

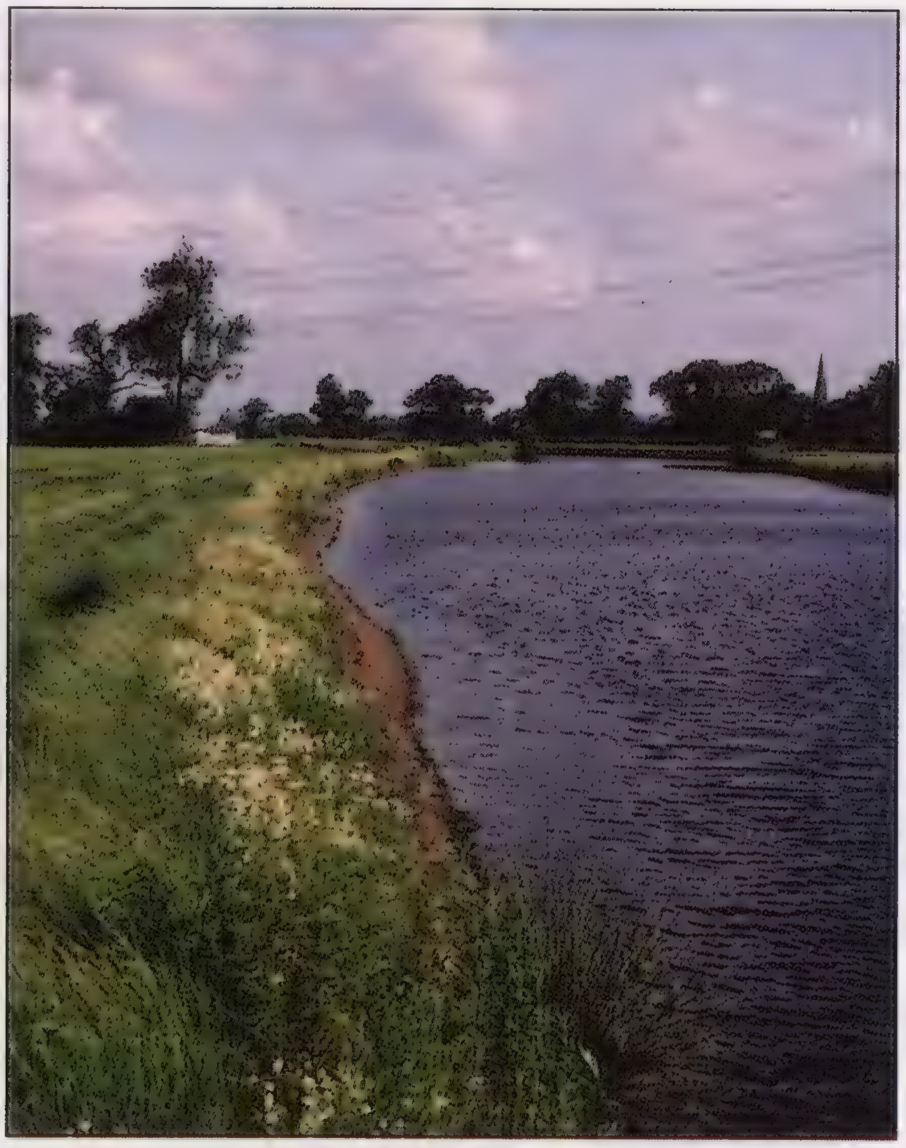

Fig. 6 Reprofiled bank on the river Soar (SK519221), 1992.

Fig. 7 Vernal pool at Loughborough Big Meadow, a habitat for rare species of *Calodera* (SK539215), 1991.

Dyschirius aeneus (Dejean), main channel: 8, floodplain: 3, 1991–1992 SK51,52,42,43
Often confused with *D. luedersi* Wagner in collections and possibly rarer than is commonly supposed. Found on bare silt and fine sand along the Soar and relatively frequent on recently re-profiled riverbanks, but otherwise less frequent than *D. luedersi,* which was recorded from a variety of different locations.

Blemus discus (Fabr.) (Fig. 8a), main channel: 6, 1991–1994 SK51,52
A nationally scarce species that overwinters in the larval stage. Adults in this study were not found earlier in the season than 26 June. Much of the sampling in the Soar Valley was aimed at spring breeders, so it is likely that this species has been under-recorded. This species may be more subterranean than most carabids and even in the right season it can be difficult to collect by hand using the normal techniques. Luff (1998) stated that this species lives near water, but it has also been collected in open, dry habitats in Leicestershire.

Trechoblemus micros (Herbst), main channel: 1, 1982–1991 SK51,52,43
Another partly subterranean species that is under-recorded by hand-collecting, but in this case frequently recorded in flood refuse (five localities). Recent local records all come from the valleys of the Soar and its main tributary, the Wreake.

Elaphropus parvulus Drapiez, main channel: 5, 1992–1994 SK51,52,42
The recent expansion in range of this nationally scarce species has been well documented (Welch, 1992). It has occurred on a wide range of sediment types along the Soar.

Bembidion punctulatum (Olivier), main channel: 7, 1991–1994 SK51,52,42
A common riparian species elsewhere in the country, its local distribution is severely limited by habitat availability. It occurs on shingle banks, which are very localised on the Soar. It is much more frequent on the Trent, where it occurs together with another shingle bank species, *B. decorum* (Zenker in Panzer), that is completely absent from the Soar.

Bembidion obliquum (Olivier), main channel: 2, floodplain: 1, 1991–2003 SK51,52,42
Another nationally scarce species that, like *Blethisa multipunctata* (L.), was formerly common around reservoirs and is now only found in the Soar Valley.

Bembidion gilvipes Sturm, main channel: 34, floodplain: 23 1984–2009 SK51,52,42,43
One of the more frequently recorded species in the Soar Valley. It occurs in grass tussocks in floodplain meadows as well as on riverbanks and in true wetland habitats. Most local records of this nationally scarce species come from river valleys.

Bembidion clarkii (Dawson), main channel: 3, floodplain: 14, 1991–2004 SK51,52,42,43
A nationally scarce species characteristic of undisturbed fluctuating marsh and the most frequently recorded of a cohort of species with similar habitats. It probably breeds in litter-rich mineral substrate exposed after winter flooding and appears to be sensitive to trampling by grazing stock as well as mechanical excavation of its habitat. In 1991 it was the dominant species at two such habitats on the floodplain at Loughborough Big Meadow, but by 2002 its dominance at one site, a shaded former channel, had been supplanted by *B. biguttatum* (Fabr.). At the other site, a shallow open former channel, it died out completely some time after 2004 following a succession of dry winters.

Bembidion fumigatum (Duftschmid), main channel: 2, floodplain: 5, 1991–2002 SK51,52,43
A nationally scarce species, somewhat erratic in its occurrence in the Soar Valley and perhaps more permanently established in the marshy margins of the local reservoirs.

Pterostichus anthracinus (Panzer), main channel: 1, floodplain: 4, 1991–1994 SK51
Pterostichus gracilis (Dejean), main channel: 1, floodplain: 6, 1986–1992 SK42,43
Both these nationally scarce species probably belong to the cohort of species associated with undisturbed fluctuating marsh. They both have restricted distributions within the valley. *P. anthracinus* is found in field ponds and ditches around Barrow upon Soar and Sileby, while *P. gracilis* is found in the Lockington Marshes complex and adjacent riverbanks.

Batenus livens (Gyllenhal), floodplain: 7, 1991–2009 SK51,52,43
Another nationally scarce species of undisturbed fluctuating marsh with a localised distribution centred on good quality habitat.

Agonum micans Nicolai (Fig. 8b), main channel: 28, floodplain: 42, 1984–2006 SK51,52,42,43
Locally very rare away from the major river valleys.

Anthracus consputus (Duftschmid), main channel: 2, floodplain: 3, 1991–2006 SK51,52,42
Nationally scarce. Infrequently recorded in a variety of sites that are difficult to categorise.

Chlaenius nigricornis (Fabr.) (Fig. 8d), main channel: 2, 1991–1994 SK51,52,42,43
Nationally scarce. Also recorded on several occasions by casual collecting in 1985 and 1987. All records in the Soar Valley are localised around Barrow upon Soar.

Demetrias imperialis (Germar), floodplain: 1, 2003 SK43
Nationally scarce. Normally found in stands of tall emergent monocots. Currently expanding its range in Britain (Luff, 1998). A record from Lockington Marshes is the first for Leicestershire.

Helophoridae

Helophorus nanus Sturm, floodplain: 1, 1991 SK43
A nationally scarce species confined to Lockington Marshes within the valley.

Staphylinidae

Atheta basicornis (Mulsant & Rey), 1986–1990 SK43
Recorded in flood refuse and by casual collecting from under bark. A nationally scarce species associated with dead wood that is periodically inundated (Boyce, 2007). All records from the valley come from Lockington Marshes.

Datomicra zosterae (Thomson), 1986 SK43
Recorded in flood refuse. I have recorded this nationally scarce species on more than one occasion from the nests of water birds. If this is its specialised habitat, it could explain why it has been so infrequently recorded.

Dochmonota clancula (Erichson), main channel: 1, floodplain: 11, 1991–2003 SK51,52,42,43
Nationally scarce. Another species of undisturbed fluctuating marsh. In the early 1990s it was apparently confined to high quality sites, but since then it has spread out and colonised new sites away from the valley.

Liogluta alpestris (Heer), floodplain: 3, 1992–1993 SK52

Very localised in the floodplain in the Loughborough area and not seen recently despite further sampling at one of its sites. Not recorded from elsewhere locally.

Pachnida nigella (Erichson), floodplain: 9, 1986–2003 SK51,52,42,43

Apart from one or two species in the Lockington Marshes, fenland species of conservation interest are absent from the Soar Valley. *Pachnida nigella* is one of a series of widespread species such as *Ocyusa picina* (Aubé) and *Stenus solutus* (Erichson) that are characteristic of permanently wet sites including fen. One of the few places that they all occur together in the valley is an old channel at Stanford on Soar (SK52), which was isolated from the main channel by the construction of a railway in the 1890s. The culvert under the railway that was built to drain the site has now become blocked by silt. Water has ponded in the channel and is now covered over by a skin of peat supporting stands of *Typha* and *Glyceria maxima* and incipient sallow scrub.

Philhygra debilis (Erichson), main channel: 1, floodplain: 1, 1982–1992 SK51,52,43

Philhygra parca (Mulsant & Rey), 1984–1986 SK52,43

Two cryptic species that are mainly recorded in flood refuse and are undoubtedly under-recorded. *Philhygra parca* is designated as provisional red data book (insufficiently known).

Philhygra gyllenhalii (Thomson), floodplain: 5, 1991–2009 SK51,52

Philhygra hygrobia (Thomson), floodplain: 5, 1991–2004 SK51,52

Two fluctuating marsh species found in Loughborough Big Meadow and sites upstream. *P. hygrobia* is designated nationally scarce.

Philhygra terminalis (Gravenhorst), floodplain: 1, 2002 SK52

Designated as provisional Red Data Book (insufficiently known). Only known in the Soar Valley from three specimens collected in a single sample from a site in Loughborough Big Meadow monitored over a long period. They could have been part of an ephemeral breeding population.

Myllaena elongata (Matthews), main channel: 4, floodplain: 3, 1991–2002 SK51,52,42

Designated nationally scarce, but now widespread by rivers, streams and ponds.

Calodera aethiops (Gravenhorst), floodplain: 6, 1989–2009 SK51,52,42,43

The least rare species of *Calodera,* whose adults can be found until July. A species of undisturbed fluctuating marsh.

Calodera protensa Mannerheim, floodplain: 1, 1989–1996 SK52

Calodera rufescens Kraatz, floodplain: 1, 1991–2009 SK52

Calodera uliginosa Erichson (Fig. 8e), floodplain: 1, 1989–2009 SK52

Three very rare species all given provisional Red Data Book status. Assing (1996) described *Calodera* species as being active in the early spring. Within the Soar Valley all records come from Loughborough Big Meadow or the nearby Bishop's Meadow and none of them were collected later in the season than 15 May. *Calodera uliginosa* has not been otherwise recorded in Britain since its original discovery on the River Stour, Hampshire between 1925 and 1927 (Harwood & Williams, 1928). At Loughborough Big Meadow it has been consistently recorded in samples taken from a shallow abandoned channel that floods in the winter, but typically dries out before April (see Table 2). The site is in an ungrazed hay meadow. Despite repeated sampling, *C. uliginosa* has never been recorded in a similar abandoned channel in

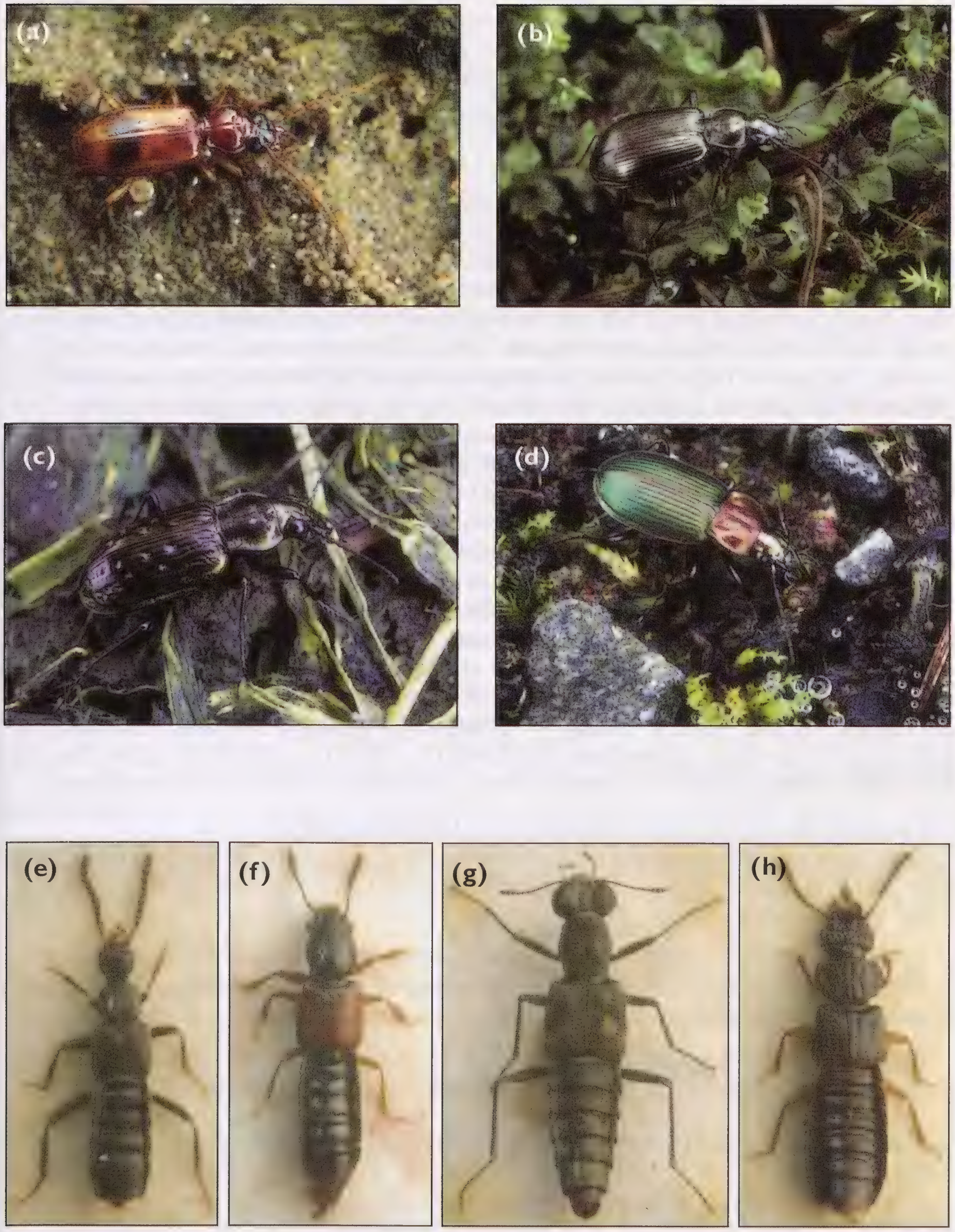

Fig. 8 (a) *Blemus discus*; (b) *Agonum micans*; (c) *Blethisa multipunctata*; (d) *Chlaenius nigricornis*; (e) *Calodera uliginosa*; (f) *Bledius gallicus*; (g) *Stenus comma*; (h) *Oxytelus fulvipes*. Photographs: Roy Anderson and Derek Lott.

Table 2. Abundance of *Calodera uliginosa* in the lower Soar Valley

	March	April	May	June	July
1991	–	6	2	0	0
2002	–	4	–	–	–
2003	5	–	–	–	–
2004	–	1	–	–	–
2005	0	–	–	–	–
2009	–	4	–	–	–

pasture just over the other side of the road. The species was easy to recognise in the field running over bare soil under algal mats. In April 1991 it was the second most abundant staphylinid recorded and it continued to be recorded in good numbers when the site was revisited in 2002 and 2003. However, after a succession of dry winters, the habitat began to look more terrestrial and in 2004 only one specimen was present in the sample. In 2005 it was absent from the sample altogether, although one specimen was collected casually by my companion, Jon Webb, during the same visit. The site was next visited on 19 April 2009 in order to set some pitfall traps and the population appeared to have recuperated after a couple of wet summers and a reasonably wet winter. One specimen was found fairly easily by some cursory sieving of litter. Two more specimens were found in the traps after they were retrieved on 24 April, when a fourth specimen was found by casual collecting. *Calodera rufescens* has been recorded from the same sample site, but only two individuals on two occasions. *Calodera uliginosa* was also recorded in company with *C. protensa* in flood refuse taken from another ungrazed shallow abandoned channel on 8th April 1989. *Calodera protensa* has also been recorded in numbers in pitfall traps set in a shallow depression in the nearby Bishop's Meadow in spring 1996 and elsewhere in Leicestershire in flood refuse from the River Eye (SK81), a tributary of the Soar in November 1986.

Calodera riparia Erichson, floodplain: 1, 1991–1992 SK52
A nationally scarce species, but one that tends to occur slightly later in the season than other *Calodera* species, sometimes as late as July. Recorded from Loughborough Big Meadow.

Ilyobates propinquus (Aubé), floodplain: 1, 1992 SK52
A cryptic nationally scarce species likely to have been under-recorded. Also recorded from dry sites elsewhere locally.

Oxypoda lentula Erichson, main channel: 1, floodplain: 5, 1991–2009 SK51,52,42
An undisturbed fluctuating marsh species restricted to good quality habitat.

Brachyusa concolor (Erichson), main channel: 4, floodplain: 7, 1991–1994 SK51,52,43
Dasygnypeta velata (Erichson), main channel: 13, floodplain: 7, 1991–1994 SK51,52,42,43
Tachyusa coarctata (Erichson), main channel: 4, 1991–1994 SK51,52,43
Three nationally scarce species associated with bare silt or clay that is often grazed. The first two species occurred both on the riverbank and in the floodplain, but *T. coarctata* was restricted to the main channel.

Ischnopoda leucopus (Marsham), main channel: 3, 1992–1994 SK52,42,43x

A species restricted to natural riverbanks with sandy sediments that are usually inaccessible to grazing stock. It often occurs with *Stenus comma* LeConte (Fig. 8g). More frequently recorded on the Trent.

Anotylus insecatus (Gravenhorst), main channel: 1, 1989–1994 SK52
Nationally scarce. Something of an enigmatic species with regard to its habitat requirements. Confined to Loughborough Big Meadow within the valley. Not recorded elsewhere locally.

Oxytelus fulvipes Erichson (Fig. 8h), floodplain: 2, 1992–1994 SK52
Nationally scarce. Confined to Loughborough Big Meadow within the Soar Valley. A species of undisturbed fluctuating marsh. Very rare locally.

Bledius subterraneus Erichson, main channel: 1, 1992 SK51
Bledius gallicus (Gravenhorst) (Fig. 8f), main channel: 2, 1992–2006 SK51,52
Bledius pallipes (Gravenhorst), main channel: 1, 1992 SK52
Three colonial species of sandy or clay riverbanks that appear to form only ephemeral breeding populations on the Soar. *Bledius pallipes* was found on a recently re-profiled bank. It is much more frequently recorded along the Trent. Lott (2008) reported the nominate form of *B. gallicus* from the Soar, but this was actually based on a dark individual of var. *laetior* (Mulsant & Rey), the form with red elytra, to which all records along the Soar should be referred.

Carpelimus lindrothi Palm, main channel: 2, floodplain: 1, 1992 SK51,52,43
Carpelimus obesus (Kiesenwetter), main channel: 3, floodplain: 2, 1991–2003 SK51,52,42
Two recent immigrants to Britain that have colonised the Soar Valley in the last few decades. Both are designated nationally scarce.

Carpelimus manchuricus (Bernhauer), main channel: 39, floodplain: 7, 1991–2006 SK51,52,42
According to Hammond (1998) this species is associated with large lowland rivers. It is well established on deposits of silt and fine sand along both the Soar and the Trent.

Stenus argus (Gravenhorst), floodplain: 8, 1991–2003 SK51,43
Nationally scarce. Possibly a species of undisturbed fluctuating marsh. Confined to Barrow-upon Soar and Lockington Marshes within the valley. Absent elsewhere locally.

Stenus carbonarius Gyllenhal, floodplain: 9, 1991–2003 SK42,43
Nationally scarce. This is a rare example in the Soar Valley of a species of conservation interest that can live in permanent wet mire. It is confined within the valley to Lockington Marshes.

Lathrobium pallidum Nordmann, main channel: 2, 1992–1994 SK52
A cryptic Red Data Book species likely to be under-recorded.

Gabrius bishopi Sharp, main channel: 12, floodplain: 7, 1986–1994 SK51,52,42,43
Neobisnius villosulus (Stephens), main channel: 9, floodplain: 1, 1991–1994 SK51,52,42

Associated with deposits of silt and fine sand. By contrast with other main-channel species, these two species have been more frequently recorded on the Soar than the Trent. *Gabrius bishopi* is nationally scarce.

Monotomidae

Rhizophagus picipes (Olivier), main channel: 1, 1991 SK52
A subcortical, nationally scarce species of waterlogged timber unlikely to have been effectively sampled by the methods used in this project.

Erirrhinidae

Notaris scirpi (Fabr.), main channel: 3, floodplain: 1, 1991–1994 SK51,52,43
A nationally scarce weevil whose adults feed on *Typha* and *Carex* species.

Tournotaris bimaculatus (Fabr.), main channel: 1, 1994 SK52
A nationally scarce weevil whose adults feed on a variety of monocots.

Curculionidae

Gymnetron villosulum Gyllenhal, main channel: 1, 1991–1994 SK51
A nationally scarce weevil associated with semi-aquatic species of *Veronica*.

Aulacobaris lepidii (Germar), 1982 SK51
A nationally scarce weevil that was found in flood refuse. It is associated with *Barbarea* species.

Discussion

The project outlined in this paper must constitute one of the most thorough investigations of the terrestrial invertebrate conservation value of a river valley anywhere in the world taking in, as it does, floodplain habitats as well as main channel habitats over a twenty year period. The species list above indicates that conservation interest was concentrated in one or two groups of species characterized by their associations with particular environmental conditions. The largest such group of species of conservation interest was associated with floodplain sites that are covered by standing water for long periods in the winter. As water levels recede in the spring, they expose substrates composed of uncompacted soils that retain a high level of humidity by virtue of the incorporation of large quantities of coarse organic litter onto the surface and in layers between silt deposited by successive winter floods (see Fig. 4). This is a resource perfect for exploitation by species with hygrophilous larvae. This group of species corresponds to those that characterize the "undisturbed fluctuating marsh" assemblage type in the ISIS classification used by Natural England to assess the conservation interest of invertebrate assemblages (Drake *et al.*, 2007).

The most widespread species of this group recorded in the project were *Bembidion clarkii* and *Carpelimus impressus* (Boisduval & Lacordaire), which were found in most suitable habitats in the floodplain. However, several species were more or less confined to two hotspots: Loughborough Big Meadow and Lockington Marshes. Suitable habitats were present outside these hotspots, most notably those clustered in a complex of ditches, old channels and field ponds around Barrow and Sileby in the southern section of the valley, but they were relatively sparse in the northern section

between the two hotspots. Several species including *Philhygra gyllenhalii, P. hygrobia, Oxypoda lentula, Oxytelus fulvipes* were present at Loughborough Big Meadow, but not at Lockington Marshes, while the reverse was the case for other species including *Pterostichus gracilis, Atheta basicornis, Datomicra zosterae* and *Stenus argus*. Lack of mobility may have been a factor influencing the distribution of some of these species.

Most of these species have also been recorded from a scattering of suitable habitats around Leicestershire including old neglected fishponds and wet woodland. The most important of these is the draw-down zone of Saddington Reservoir (SP69) just over 20km to the south of the lower Soar Valley. Saddington Reservoir lacks some of the species found in the Soar Valley, but supports populations of other species in this group that are not found in the valley. These include *Aloconota languida* (Erichson), *Parameotica difficilis* (Brisout), *Stenus fuscipes* Gravenhorst. and *S. pallipes* Gravenhorst. Once again, lack of mobility may be a factor in the distribution of some of these species. I have also found examples of this assemblage type in the floodplains of the Trent, Dove, Great Ouse and Thames as well as in well vegetated dune slacks around the coast.

The three rarest species of *Calodera* appear to be only loosely associated with this group. They were confined to unshaded depressions in grassland, whose surface water disappeared early in the season (see Fig. 7). Further sites for these species may possibly be discovered by concentrating recording effort in March or April on similar habitats elsewhere in the country.

Conservation interest was also represented by species associated with fresh, sparsely vegetated deposits of fine sediments along the main channel (see Fig. 5). This group of species included *Clivina collaris, Carpelimus manchuricus, Gabrius bishopi* and *Neobisnius villosulus*. However, further species of this group, such as *Ischnopoda leucopus* and *Bledius pallipes* were more frequently recorded on the Trent, which also supported other species not recorded on the Soar including *Bembidion fluviatile* Dejean and *Philonthus atratus* (Gravenhorst). In general, the larger river probably supports better examples of this assemblage type, which corresponds to the ISIS "riparian sand" assemblage type. Unlike the "undisturbed fluctuating marsh" species, which tended to be faithful to particular sites, "riparian sand" species appeared to be more mobile and move from site to site.

Finally mention should be made of other assemblage types of interest in the Soar Valley that were not targeted by the sampling methods described above. These include species associated with old herb-rich grassland such as the click beetles, *Ctenicera pectinicornis* (L.) and *Oedostethus quadripustulatus* (Fabr.), and a rich and varied saproxylic fauna associated with willows and ash. The conservation interest of aquatic beetles in the lower Soar is limited to the presence of the flightless *Noterus crassicornis* (Müller) at Lockington Marshes.

Acknowledgements

Survey work was variously funded by the National Rivers Authority (now the Environment Agency), English Nature (now Natural England) and Leicestershire County Council. Sally Mousley of Charnwood Borough Council kindly made material from pitfall traps set at Bishop's Meadow available for study. Gyorgy Makranczy identified the specimen of *Carpelimus alutaceus* and Volker Assing identified the specimen of *Lathrobium ciceronii*. Especial thanks to Roy Anderson for supplying the carabid photographs in Fig. 8.

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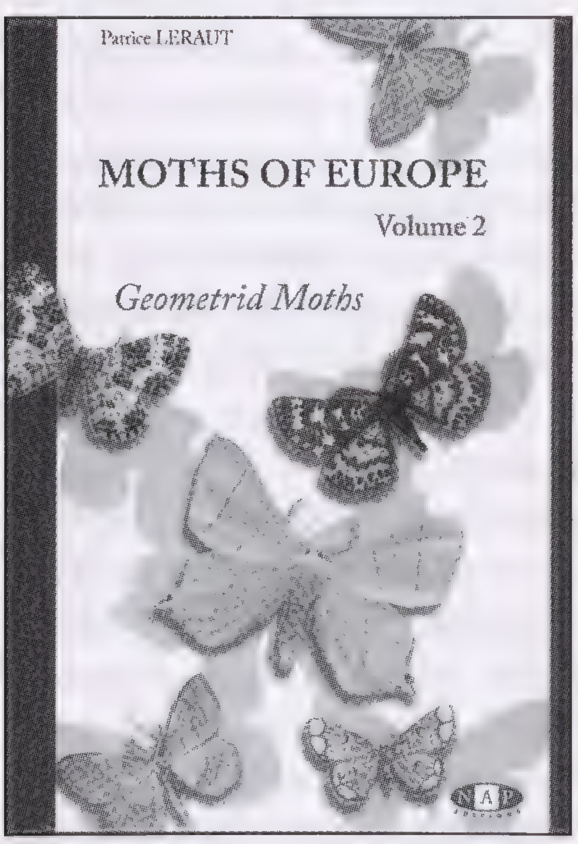
Appendix 1 – List of rarer vagrant species

The following species were represented by odd individuals. As far as is known, none of these species has cryptic habits that would reduce their likelihood of being detected by the sampling methods used in the project and it is considered likely that they are vagrants to the Soar Valley or at least to the habitats sampled. Species not currently on the British list are marked with an asterisk.

Chlaenius vestitus (Paykull), main channel: 1, 1994 SK51
Cercyon bifenestratus Küster, main channel: 1, 1992 SK52
Acrotona obfuscata (Gravenhorst), main channel: 2, 1992 SK51,52
Aloconota planifrons (Waterhouse), main channel: 1, 1992 SK52
Schistoglossa gemina (Erichson), floodplain: 1, 1991 SK43
Deleaster dichrous (Gravenhorst), main channel: 1, 1994 SK51
Carpelimus alutaceus (Fauvel), main channel: 1, 1990 SK52*
Stenus assequens Rey, main channel: 1, 1991 SK51
Stenus incrassatus Erichson, floodplain: 1, 1991 SK51
Lathrobium ciceronii (Zanetti) , floodplain: 1, 2002 SK52*
Lathrobium impressum Heer, floodplain: 1, 1991 SK51
Lathrobium pallidipenne Hochhuth, floodplain: 1, 1984–1991 SK42

BOOK REVIEW



Moths of Europe. Volume 2. Geometridae by Patrice Leraut. Published by N.A.P. Editions 2009. 804 pages with 200 line drawings (plus 158 colour plates) £72.00 Hardback. ISBN 978-2-913688-09-4.

This is the second of a, so far envisaged, four volume series of guides to European Lepidoptera.

Until the publication of the book '*Guide des papillons nocturnes de France*' in 2007, published by Delachaux & Nestlé, those of us attempting to identify geometrid moths in the South of France had to make do with a very expensive reprint of volumes III & IV of the difficult to use Jules Culot, *Géomètres d'Europe*, published in Geneva between 1917 and 1920, either that or we had to refer to a multitude of publications in several languages often conflicting and with no one publication ever covering the whole of the fauna.

Now at long last we have a workable field guide, albeit a little on the heavy side, in English, not just with the French geometrids, but covering the whole of Europe and North Africa in the one volume. It is pocket-sized, for those with strong pockets that is. One could argue that this book has come just a little too late, in view of having been preceded by the 2007 publication, but for those of us who do field work in other parts of the area covered, it is very welcome. As a plus we have an English version translated by Nicholas Flay who, according to the author himself, has much improved upon the French version.

This tends towards a specialist book, a little on the expensive side, but then it covers around 1000 species, some three times as many geometrids as are indigenous to the British and Irish Isles. It treats as well three species from the Uraniidae. The plates are, for the most part, clear, but the illustrations are not to scale. Leraut has

either enlarged or reduced the images to give approximately the same number of species illustrated on each plate. This could produce a difficulty for those unfamiliar with this group. To compensate for this, the size of the moth is given in the captions to the plates, but not always. Leraut has made a point of seeking out a vernacular name wherever possible, perhaps to try and make recording more palatable for those not too happy with latin names. In contrast to the *Guide des papillons nocturnes de France*, however, where a variety of forms is possible, several illustrations are given for each species. Flightless females are also illustrated where relevant.

The text gives a distribution map for each species, or almost every species described, and there are illustrations of genitalia where the separation of closely related species is difficult. It is obvious he could not illustrate the genitalia for everything or the book would be just too big. So there are times when the reader is going to be disappointed. He gives no help in separating *Macaria alternata* (D.&S.) and *Macaria notata* (L.) for instance, but he does show the genitalia for *Xanthorhoe spadicearia* (D.&S.) and *Xanthorhoe ferrugata* (Clerck). I also see that he has line drawings of the genitalia and abdominal plates for *Epirrita dilutata* (D.&S.), *E. christyi* Prout, *E. autumnata* (Borkhausen), but not *E. filigrammaria* (H.-S.). It is important I feel that lepidopterists should dissect to check identifications, making these drawings a very useful addition. It is not always simple, and often quite misleading, to work entirely on wing patterns. We have had one glaring example of what can happen with the example of the Pine Hawk moth in Southern France. Upon seeing one of these huge moths, it would be easy for the unwary to just tick off *Hyloicus pinastri* L., but it could easily be *Hyloicus maurorum* Jordan, a quite distinct species with wing patterns very often indistinguishable from *H. pinastri*. Which means that, if one was not aware that two sympatric species was a possibility, all observations are invalidated. People often use difficulty of determination as a reason why they do not choose to study micro moths, but some groups of geometrids, such as the genus *Eupithecia* are so similar in appearance as to be every bit as difficult, if not more difficult to identify than micros. With this group Leraut does give us all the necessary line drawings of genitalia.

The area covered by the guide extends to the European part of Turkey and Mediterranean North Africa, but Leraut in his usual fashion, when working with a particular genus, throws in a few extra species for comparison, which takes us from Labrador to Mauritania and through the Middle East to India, China and even Japan. Where he has known of a species but been unable to find a specimen to photograph, he has given us a description in the text anyway. How many times have we kicked ourselves for not having considered a given species as a possibility when trying to identify a moth. It is truly invaluable to have a complete list so that one can make a progressive elimination to be able to come to the correct one.

Those familiar with European geometrids will know that a comprehensive, and much more expensive, series of guides to the identification of European geometrids, the *Geometrid moths of Europe*, has been in course of publication since 2001. This work is still incomplete and we shall have to wait until at least 2012 for completion. It should be said that the authors of the *Geometrid moths of Europe*, are not always in agreement with Leraut's approach. He is apt to change the taxonomy unnecessarily, even incorrectly and they disagree on a number of Leraut's conclusions on taxonomy. Anyone making a serious study of European geometrids is advised to cross-check with *Geometrid moths of Europe*. There are also critical comments to be found on the Zoologische Staatssammelung München web site.

TERENCE HOLLINGWORTH

OBSERVATIONS OF APHIDS (APHIDOIDEA) NEW TO WALES

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ABSTRACT

Observations of 77 aphid species new to Wales are reported. The aphids are listed in alphabetical order of genera, and information is provided concerning the location(s) where the aphids were found, host plant association(s), attendant ants and evidence of parasitism or predation.

INTRODUCTION

Aphids and their associated parasitoids and hyperparasitoids are under-recorded groups in Britain. For many species, very little is known about their biology, ecology and distribution.

The early history of aphid recording in Wales is covered by Stroyan (1959), with the majority of early records coming from North Wales and arising from the work of V. F Eastop, F. H Jacob, H. L. G Stroyan, F. V Theobald, C. L Walton and E. J. Vevai. Wood-Baker (1991) provides details of 172 aphids recorded by the late C. S Wood-Baker during the Welsh Peatland Invertebrate Survey conducted in Dyfed between 1987 and 1989.

According to a checklist of aphids in Wales, in preparation by Dr G. W Hopkins, over 400 species are known from Wales, with this paper taking the list closer to 500. The British aphid fauna comprises over 600 species. Compared with many areas of Britain, the aphid fauna of Wales is relatively well known and includes interesting species in the uplands such as the boreo-alpine *Macrosiphum weberi* (Börner), *Ericaphis latifrons* (Börner), *Nasonovia saxifragae* (Doncaster & Stroyan) and *Brachycaudus sedi* (Jacob). Aphids that feed on coastal plants and *Carex* species in damp, unimproved grasslands are also well represented in the Welsh aphid fauna.

Since 2004 the author has collected aphids in Cardiff, Barry and the surrounding countryside, to obtain baseline information on aphid diversity, distribution and ecology. In all cases aphids were first observed in the field using an $\times 10$ hand lens, before being collected using a paintbrush and alcohol. Mature apterae and alatae were then examined under an $\times 60$ stereomicroscope. Identifications were made following consideration of morphological features and other information detailed in the keys of Stroyan (1963, 1977 & 1984), Carter & Maslen (1982), Blackman & Eastop (1994), Nieto Nafría & Mier Durante (1998), Nieto Nafría *et al.* (2002), Wojciechowski (2003), Nieto Nafría *et al.* (2005) and Blackman & Eastop (2006). Notes were taken on appearance in life, host plant, feeding position and associations with other organisms, to assist in making identifications. Where identifications could not be made using this combination of factors, specimens were sent to the Food & Environment Research Agency (FERA, formerly the Central Science Laboratory) for detailed examination of morphological features. In some cases, specimens were sent by FERA to the Natural History Museum (NHM) for further examination. Specimens of *Aphis gentianae* (Börner), *Aphis ochropus* Koch, *Cinara curvipes* (Patch), *Illinoia liriodendri* (Monell) and *Schizolachnus obscurus* (Börner) were retained by FERA, preserved as Canada Balsam slides and deposited in their collection.

Some aphid parasitoids were reared from aphid 'mummies' and identified using the information and keys contained in Starý (1966). Dr Gavin Broad identified a

Praon sp. (Aphidiidae) parasitizing *Illinoia liriodendri* and *Pauesia laricis* (Haliday) (Aphidiidae) parasitizing *Cinara brauni* Börner and *Cinara schimitscheki* Börner. Predatory Heteroptera were identified using the keys in Southwood & Leston (1959). Predatory Coccinellidae were identified using Majerus & Kearns (1989). Mutualistic ants were identified using Pontin (2005). Predatory larvae of Syrphidae were identified using Rotheray (1993).

The following list details the aphid species collected by the author between 2004 and 2008 that are considered new records for Wales. The 'new to Wales' status is accorded on the basis of there being no published or unpublished records known to the author, or present on the checklist of aphids in Wales, in preparation by Dr G. W. Hopkins.

The aphids

***Acaudinum centaureae* (Koch) (Aphidinae: Macrosiphini)**

Recorded in June 2005 only, but in large numbers, feeding on the basal parts of a single *Centaurea scabiosa* plant growing on coastal calcareous grassland at Cold Knap Point, Barry, sheltered and attended by the garden ant *Lasius niger* (L.).

***Acyrthosiphon malvae* subsp. *agrimoniae* (Börner) (Aphidinae: Macrosiphini)**

In small numbers feeding on the flowering stems of *Agrimonia eupatoria* growing at the edge of a pebble beach at The Knap, Barry and Merthyr Mawr sand dunes, during late summer in 2008.

***Acyrthosiphon malvae* subsp. *rogersii* (Theobald) (Aphidinae: Macrosiphini)**

In small numbers during May 2006 on *Fragaria vesca,* at Casehill Woods, Dinas Powis.

***Anuraphis farfarae* (Koch) (Aphidinae: Macrosiphini)**

In July 2007 on subterranean parts of a single *Tussilago farfara* plant growing on 'brownfield' land in Cardiff Bay. Attended by *L. niger* and parasitized by the aphidiid *Paralipsis enervis* (Nees).

***Aphis brunellae* Schouteden (Aphidinae: Aphidini)**

On *Prunella vulgaris* growing in a garden in Barry during the summers of 2005 and 2006 and on *P. vulgaris* growing on amenity grassland in Cardiff Bay, during the summer of 2007. Sheltered and attended by *L. niger*.

***Aphis coronillae* subsp. *arenaria* Hoffmann (Aphidinae: Aphidini)**

On subterranean parts of *Medicago lupulina*, growing on 'brownfield' land in Cardiff Bay during summer, 2007. Sheltered and attended by *L. niger*.

***Aphis crepidis* (Börner) (Aphidinae: Aphidini)**

Feeding sheltered and attended by *L. niger* on basal and subterranean parts of *Crepis capillaris* growing on amenity grassland at County Hall, Cardiff Bay, during the summer of 2007. Also attended and sheltered by *L. niger* on subterranean and rarely the upper parts of a *Crepis* species growing beside a pebble beach at The Knap, Barry, during the summer of 2008.

***Aphis cytisorum* subsp. *sarothamni* Franssen (Aphidinae: Aphidini)**

Recorded in August 2006 feeding whilst attended by *L. niger* on stems and seed pods of an ornamental *Cytisus* species growing in a park in Barry.

***Aphis gentianae* (Börner) (Aphidinae: Aphidini)**

This species was found new to Britain in July 2007 and full details of its discovery are reported in detail in a separate paper (Baker, 2009). So far the aphid has been found attended by *Lasius niger* at Cosmeston Park, Penarth, feeding on subterranean parts of *Centaurium erythraea* and *Blackstonia perfoliata*, and from *C. erythraea* at Merthyr Mawr sand dunes.

***Aphis lambersi* (Börner) (Aphidinae: Aphidini)**

Feeding on basal and subterranean parts, occasionally higher up the main stem, of *Daucus carota*, sheltered and attended by *L. niger*. Very common in all years and known from many locations including Cosmeston Park, Penarth, Cardiff Bay and calcareous grasslands at The Knap, Barry and Lavernock Point, Lavernock.

***Aphis lotiradicis* Stroyan (Aphidinae: Aphidini)**

Feeding attended and sheltered by *L. niger* on subterranean parts of a *Lotus* species growing on calcareous grassland at Cosmeston Park, Penarth, during the summers of 2007 and 2008.

***Aphis ochropus* Koch (Aphidinae: Aphidini)**

This species was found new to Britain in July 2007 and full details of its discovery are reported in a separate paper in this issue (Baker, 2009). *Aphis ochropus* has so far been collected from subterranean parts and the basal leaflets of *Dipsacus fullonum* plants growing on calcareous soils at Cosmeston Park, Penarth, Dunraven Bay in the Vale of Glamorgan and from 'brownfield' land in Cardiff Bay. In all cases the aphids were sheltered and attended by *L. niger*.

***Aphis polygonata* Nevsky (Aphidinae: Aphidini)**

Present in June, 2008, on several *Polygonum aviculare sensu lato* growing at the base of a concrete wall, adjoining a pebble beach at The Knap, Barry. All colonies were attended, but not sheltered, by *L. niger*.

***Aphis sanguisorbae* subsp. *poterii* (Börner) (Aphidinae: Aphidini)**

Feeding on basal and subterranean parts of *Sanguisorba minor*, growing on calacareous soils at Cold Knap Point, Barry and Lavernock Point, Lavernock, during summer 2007. Attended and sheltered by *Lasius niger*.

***Aphis spiraecola* Patch (Aphidinae: Aphidini)**

Feeding in large numbers on a *Viburnum tinus* plant in Cardiff Bay, during May 2007, but the aphids disappeared rapidly and they were not found on *V. tinus* in the same locality during 2008. *Viburnum tinus* has not been recorded as a host for *A. spiraecola* in Britain previously.

***Aphis umbrella* (Börner) (Aphidinae: Aphidini)**

Recorded in June 2006, attended by *L. niger* and *Formica fusca* (L.) whilst feeding underneath umbrella shaped 'pseudo-galls', formed from *Lavatera arborea* leaves, on plants growing on the edge of coastal cliffs at St. Justinians, Pembrokeshire. Also observed in July 2007 and 2008, attended by *L. niger* whilst feeding underneath umbrella 'pseudo-galls', formed from *Malva sylvestris* leaves, on 'brownfield' land in Cardiff Bay.

***Aphis verbasci* Schrank (Aphidinae: Aphidini)**

A single aptera and single alata were recorded feeding on *Verbascum thapsus* at Merthyr Mawr sand dunes in June 2007, attended by a *Myrmica* species.

Subsequently recorded during July 2007, attended by *L. niger* whilst feeding in large numbers on the leaf undersides of *Buddleija davidii*, growing in Cardiff Bay.

***Aphis violae* Schouteden (Aphidinae: Aphidini)**
In July 2007 feeding below ground level on *Viola tricolor* at Merthyr Mawr sand dunes. Attended and loosely sheltered with sand by *L. niger*.

***Appendiseta robiniae* (Gillette) (Calaphidinae: Panaphidini)**
In May 2006 feeding in small numbers on the leaf undersides of *Robinia pseudoacacia* in Victoria Square, Penarth. Subsequently found in summer 2007, feeding in small numbers on a *R. pseudoacacia* at Tremorfa Park, Cardiff.

***Brachycaudus bicolor* (Nevsky) (Aphidinae: Macrosiphini)**
In June 2008 feeding on subterranean parts of a *Cynoglossum officinale* plant growing at Merthyr Mawr sand dunes. Attended by the garden ant *L. niger*, with a loose sand shelter constructed at the base of the main stem.

***Brachycaudus (Nevskyaphis) malvae* (Shaposhnikov) (Aphidinae: Macrosiphini)**
Large colonies feeding whilst attended and sheltered by *L. niger* on several *Malva sylvestris* plants, growing on the edge of a pebble beach at The Knap, Barry, during summer 2008. Feeding was concentrated on basal parts of the plants, but some aphids moved to feed on aerial parts as summer progressed.

***Callipterinella minutissima* (Stroyan) (Calaphidinae: Calaphidini)**
Locally common feeding in small numbers on *Betula papyrifera* and a white barked *Betula* species in Cardiff Bay. Not observed on native *Betula* species. First noted in 2006 as oviparae feeding close to vein junctions on leaf undersides, subsequently noted feeding within catkins which became covered in sooty moulds.

***Callipterinella tuberculata* (von Heyden) (Calaphidinae: Calaphidini)**
In summer 2005 and 2006 observed feeding on a single *Betula pendula* in Barry docks and on two *Betula papyrifera* in Cardiff Bay. Subsequently found on a *B. pendula* in Cyncoed, Cardiff and on several *B. pendula* saplings growing close to one another at Merthyr Mawr sand dunes. In all cases the aphids were attended vigorously by *L. niger* and fed primarily on leaf undersides, but also on leaf upper surface and petioles. Alatae were common where colonies attained high densities.

***Chaitophorus horii* subsp. *beuthani* (Börner) (Chaitophorinae: Chaitophorini)**
In small numbers on the leaf undersides of *Salix viminalis* growing in Cwm Talwg, Barry and Cosmeston Park, Penarth.

***Chaitophorus populialbae* (Boyer de Fonscolombe) (Chaitophorinae: Chaitophorini)**
Occasionally attended by *L. niger* but more often feeding without ant attendance, on leaf undersides of *Populus alba*. Occasional predation by the mirid bug, *Sthenarus rotermundi* Scholtz noted. *Bombus* species were observed foraging on honeydew. Recorded from Cardiff Bay, Bute Park, Cardiff and Merthyr Mawr sand dunes.

***Chaitophorus salicti* (Schrank) (Chaitophorinae: Chaitophorini)**
In small numbers on the leaf undersides of two *Salix caprea* on Severn Avenue, Barry, on a few young *S. caprea* in Cardiff Bay and on a *S. cinerea* at Cosmeston Park, Penarth. In all cases vigorously attended by *L. niger*.

Chaitophorus tremulae **Koch (Chaitophorinae: Chaitophorini)**

In spring 2006 recorded from *Populus tremula* in Cardiff Bay and Newport, Pembrokeshire. Aphids were situated on both leaf surfaces and no ants were in attendance. However, the garden ant *L. niger* was observed in 2008 attending *C. populeti* (Panzer), feeding on leaf petioles, on the trees in Cardiff Bay. The ants ignored *C. tremulae* which fed at the same time on the same leaves.

Chaitophorus truncatus **(Hausmann) (Chaitophorinae: Chaitophorini)**

In November 2006, small colonies were observed on the leaf under and upper surfaces of a narrow leafed *Salix* species in Cardiff Bay. The aphids were clustered around blister galls caused by *Pontania* sawflies. They appeared to be feeding at the base of the galls, presumably because leaf tissues were especially rich in nutrients or nutrients were more easily accessed. Similar feeding was noted in 2007 and 2008, but colonies were also found on *S. purpurea* in Cardiff Bay, not associated with galls.

Chaitophorus vitellinae **(Schrank) (Chaitophorinae: Chaitophorini)**

Vigorously attended by *L. niger* whilst feeding on stems and petioles of a *Salix alba* at Cosmeston Park, Penarth, in September 2006. Subsequently found feeding in small numbers, attended by *L. niger* on stems and leaf petioles of a narrow leafed *Salix* growing in Cardiff Bay.

Chromaphis juglandicola **(Kaltenbach) (Calaphidinae: Panaphidini)**

In September 2007, observed feeding on the leaf undersides of a walnut tree, *Juglans regia*, in Roath Park, Cardiff.

Cinara acutirostris **Hille Ris Lambers (Lachninae: Cinarini)**

Observed in moderate numbers in August 2008, feeding on the underside of a 5cm diameter branch and a 7cm diameter branch, on a young *Pinus nigra* in Cardiff Bay, attended by *Lasius niger*. The aphids were well camouflaged against the bark. No other aphid species was found on the host tree.

Cinara brauni **Börner (Lachninae: Cinarini)**

Since 2005 observed feeding in moderate numbers on four young *Pinus nigra* in Barry docks and four young *P. nigra* in Cardiff Bay. Feeding focused on the topside of stems up to 5cm in diameter early in the season, where individuals were well camouflaged against the bark. Moved quickly like an arachnid when disturbed. Later in the growing season, feeding became more focused around terminal growing points. In all cases vigorously attended by *L. niger*. Occasionally predated by the mirid bug *Pilophorus cinnamopterus* (Kirschbaum), not recorded in Wales since before 1892 (Howe, 2004). The coccinellids, *Anatis ocellata* (L.), *Harmonia quadripunctata* (Pontoppidan) and *Exochomus quadripustulatus* (L.) and larvae of the syrphids, *Episyrphus balteatus* (De Geer) and *Syrphus ribesii* (L.) were also observed predating aphids. Parasitism by the aphidiid *Pauesia laricis* was noted and the social wasp *Vespula vulgaris* (L.) regularly foraged on honeydew. The aphid species *Cinara schimitscheki*, *Schizolachnus obscurus* (Börner) and *Eulachnus rileyi* (Williams) were invariably present on the same trees. The only previous record of *C. brauni* from the UK is of an alate female captured in a suction trap at Alice Holt, Hampshire (Carter & Maslen, 1982).

Cinara cedri **Mimeur (Lachninae: Cinarini)**

In September 2007 feeding in small numbers on terminal growth of a mature *Cedrus libani* in Roath Park, Cardiff and a mature *C. atlantica* in Gorsedd Gardens,

Cardiff. Subsequently found feeding on terminal growth of an established *C. deodara* at Romilly Park, Barry.

Cinara confinis **(Koch) (Lachninae: Cinarini)**

In April 2007 feeding in large numbers on the undersides of 2–10 cm stems of a mature *Abies* in Roath Park, Cardiff.

Cinara costata **(Zetterstedt) (Lachninae: Cinarini)**

In April 2007 observed feeding on 2-5cm stems of a mature *Picea orientalis* in Roath Park, Cardiff. A scale insect of the genus *Physokermes* was present on the same tree.

Cinara cupressi **(Buckton) (Lachninae: Cinarini)**

Feeding observed on a *Cupressus macrocarpa* in Romilly Park, Barry, in 2007, and on a prostrate variety of *Chamaecyparis lawsoniana* in Cardiff Bay during 2008. This species and/or the similar *Cinara cupressivora* Watson & Voegtlin, has almost certainly been present for many years in Cardiff, considering the observations of local horticulturists and arboriculturists.

Cinara curvipes **(Patch) (Lachninae: Cinarini)**

A large, dense colony was found in spring 2007, feeding on the underside of a 15cm diameter *Abies grandis* branch, at a synagogue in Cyncoed, Cardiff. Honeydew pooled beneath the affected branch, attracting *Vespula vulgaris*. *Anatis ocellata* adults were observed close to the edge of the colony and were likely predating aphids. This aphid was first found in the UK in 1999, feeding on *Cedrus atlantica* at Kew (Martin, 2000), with a second record in 2004 from an *Abies* of uncertain species in Sheffield (Roger Hammon, *pers. comm.*).

Cinara fresai **Blanchard (Lachninae: Cinarini)**

Observed in summer 2004, feeding in a compact colony on a columnar species of *Juniperus* growing in a garden in Penarth.

Cinara laportei **(Remaudière) (Lachninae: Cinarini)**

In early spring during 2005 and 2006 feeding in small numbers on terminal growth of a young *Cedrus deodara* in Cowbridge and an established *C. atlantica var. glauca* in Romilly Park, Barry. In 2007, observed on a young *C. atlantica var. glauca* at The Knap, Barry, and on a second young *C. atlantica var. glauca* in Romilly Park, Barry.

Cinara pectinatae **(Nördlinger) (Lachninae: Cinarini)**

In small numbers on a mature *Abies* species in Roath Park, in April 2007. Feeding at the base of needles and well camouflaged due to their green coloration.

Cinara pilicornis **(Hartig) (Lachninae: Cinarini)**

In small numbers on terminal growth of a mature *Tsuga heterophylla* in Hensol Forest, Vale of Glamorgan and a mature *Picea pungens var. glauca* in Porthkerry Park, Barry, during June 2006. Subsequently found on a mature *P. sitchensis* in Romilly Park, Barry, during June 2007.

Cinara schimitscheki **Börner (Lachninae: Cinarini)**

Since 2006 observed feeding in small to moderate numbers on several *Pinus nigra* trees, of mixed age, in Barry docks, Romilly Park, Barry and Cardiff Bay. Usually,

but not always attended by the garden ant *Lasius niger* and feeding especially on terminal growth. A clumsy mover when disturbed unlike *Cinara brauni*, with which it was often found. During hot weather in 2006 many aphids on a tree in Cardiff Bay were observed moving from feeding on stems in the crown, to positions of shelter beneath bark plates on the trunk. Predation was observed by the mirid bug *Pilophorus cinnamopterus*, the coccinellids *Anatis ocellata*, *Harmonia quadripunctata* and *Exochomus quadripustulatus* and larvae of the syrphids *Episyrphus balteatus* and *Syrphus ribesii*. Parasitism by the aphidiid *Pauesia laricis* was noted and *Vespula vulgaris* foraged regularly on honeydew.

***Coloradoa bournieri* Remaudière & Leclant (Aphidinae: Macrosiphini)**

In July 2008 feeding in small numbers on a *Santolina chamaecyparissus*, growing in a container situated in the car-park of County Hall, Cardiff Bay.

***Crypturaphis grassii* Silvestri (Calaphidinae: Calaphidini)**

Since first being recorded in 2005 on a mature *Alnus cordata* tree in Barry, this aphid has been found on virtually every *A. cordata* tree examined in Barry and Cardiff.

***Dysaphis newskyi* (Börner) (Aphidinae: Macrosiphini)**

In May 2007 feeding at the root collar of *Heracleum sphondylium* in Porthkerry Park, Barry. The aphids were sheltered and attended by *L. niger* and *Myrmica ruginodis* (Nylander).

***Glyphina pseudoschrankiana* Blackman (Thelaxinae)**

In large numbers in June 2007 on a young *Betula pubescens* at Merthyr Mawr sand dunes. Vigorously attended by *L. niger*. The aphids were present all over the tree but apparently suitable host trees nearby did not hold any aphids.

***Hoplocallis picta* (Ferrari) (Calaphidinae: Panaphidini)**

Small numbers were observed in July 2006, feeding on the leaf undersides of three young *Quercus ilex* in Cardiff Bay. A single alate female was found on a mature *Q. ilex* in Roath Park, Cardiff, in April 2007. Populations have been maintained at very low levels on the Cardiff Bay trees which were also colonised by *Myzocallis schreiberi* Hille Ris Lambers & Stroyan and *Lachnus roboris* (L.). The species is only known in the UK from a handful of suction trap records in Southern England (Richard Harrington, *pers. comm.*).

***Hyadaphis passerinii* (del Guercio) (Aphidinae: Macrosiphini)**

In 2005 observed feeding on *Lonicera periclymenum* at Cold Knap Point, Barry.

***Hyperomyzus picridis* (Börner & Blunck) (Aphidinae: Macrosiphini)**

On *Picris hieracioides* in 2005 at Barry docks and from Cardiff Bay and Merthyr Mawr sand dunes in 2008. On *P. echioides* at Cardiff Bay Wetlands Reserve in July 2008.

***Illinoia liriodendri* (Monell) (Aphidinae: Macrosiphini)**

In summer 2007 on *Liriodendron tulipfera* trees at Romilly Park, Barry and Cardiff Bay. In 2008, additional populations were observed on *Liriodendron* at Roath Park, Cardiff. In 2008, populations achieved very high levels in late summer, such that leaves were shiny with honeydew which was foraged by *Vespula vulgaris* and other

insects. Predation noted by the invasive *Harmonia axyridis* Pallas and *Syrphus ribesii* larvae. A few aphids on trees in Cardiff Bay and Romilly Park were parasitized in 2008 by a species of *Praon*, probably *P. volucre*. During damp summer weather in 2008, some aphids died after apparent colonisation by fungal pathogens.

Illinoia morrisoni **(Swain) (Aphidinae: Macrosiphini)**
In September 2007, observed on young *Sequoia sempervirens* at Roath Park, Cardiff.

Lachnus roboris **(L.) (Lachninae: Lachnini)**
In summer 2006 feeding on young *Quercus ilex* and *Q. palustris* at Roath Park, Cardiff. Subsequent observations of feeding on young *Q. ilex* and *Q. palustris* in Cardiff Bay, on *Q. castanaefolia* in Gorsedd Gardens, Cardiff and *Q. robur* in public open space, near Porthkerry Park, Barry. Vigorously attended by *Lasius niger*.

Liosomaphis berberidis **(Kaltenbach) (Aphidinae: Macrosiphini)**
In February 2008, found in small numbers on the underside of *Mahonia* leaves in Cardiff Bay. In May 2008 on *Mahonia* in Roath Park, Cardiff.

Macrosiphum ptericolens **Patch (Aphidinae: Macrosiphini)**
In 2007 observed feeding on *Pteridium aquilinum* at Porthkerry Park, Barry and in woodlands adjoining Carreg Cennen Castle, Carmarthenshire.

Maculolachnus submacula **(Walker) (Lachninae: Lachnini)**
In summer 2007 feeding on an ornamental *Rosa* species at St. Donats Castle, St. Donats and on *Rosa canina* at Cosmeston Park, Penarth. In both cases sheltered and attended by *L. niger*.

Metopeurum fuscoviride **Stroyan (Aphidinae: Macrosiphini)**
First recorded in summer 2005, feeding in large numbers on two *Tanacetum vulgare* plants in Barry docks, vigorously attended by *L. niger*. Dense colonies have recurred every year since on the same plants.

Myzocallis schreiberi **Hille Ris Lambers & Stroyan (Calaphidinae: Panaphidini)**
Commonly found on the leaf undersides of *Quercus ilex* in Barry and Cardiff. Often continuing to reproduce over the winter and attaining moderate population sizes with extensive honeydew and subsequent sooty mould colonisation. The aphid was occasionally parasitized by an aphidiid species, probably *Trioxys pallidus* (Haliday).

Myzocallis walshii **(Monell ex Riley & Monell) (Calaphidinae: Panaphidini)**
Found in 2004 on two mature trees of *Quercus rubra*, in the grounds of Kedleston House, Derbyshire. Subsequently found on *Q. rubra* at Bute and Roath Parks, Cardiff, on a street tree *Q. rubra* near Cardiff Central Railway Station, at Duffryn Gardens in the Vale of Glamorgan and on a street *Q. rubra* in Barry. This aphid has only been recorded previously in the UK from two suction trap records (Richard Harrington, pers. comm.).

Myzus langei **(Börner) (Aphidinae: Macrosiphini)**
In summer 2008 feeding in small numbers on *Galium mollugo* in Porthkerry Park, Barry, attended by *Myrmica ruginodis*. Despite a local abundance of the host, the aphid was restricted to a handful of plants.

***Myzus varians* Davidson (Aphidinae: Macrosiphini)**

Observed in summer 2007, attaining high populations on *Clematis vitalba* in Cardiff Bay.

***Panaphis juglandis* (Goeze) (Calaphidinae: Panaphidini)**

In May 2005 feeding on the upper surfaces of the leaves of a *Juglans regia* in a garden on Colcot Road, Barry. In September 2007 observed feeding on the leaf upper surfaces of a *J. regia* in Gorsedd Gardens, Cardiff.

***Pemphigus spyrothecae* Passerini (Pemphiginae: Pemphigini)**

Galls and aphids recorded from *Populus nigra var. italica* in Bute Park, Cardiff and The Knap, Barry.

***Periphyllus californiensis* (Shinji) (Chaitophorinae)**

In 2007, observed in large numbers on *Acer palmatum* at Bute Park, Cardiff.

***Periphyllus lyropictus* (Kessler) (Chaitophorinae)**

Common on *Acer platanoides* all over Cardiff and Barry, frequently forming significant, *Lasius niger* attended populations, with extensive honeydew production. Extensive sooty mould colonisation was not observed on *A. platanoides* leaves covered in honeydew, in contrast to *Tilia* leaves colonized by *Eucallipterus tiliae* (L.) or *A. pseudoplatanus* leaves colonized by *Drepanosiphum platanoidis* (Schrank). Parasitized aphids were often observed, with the causal agent likely to be the aphidiid *Aphidius setiger* Mackauer, found new to the UK in 2007 by the author, parasitizing *Periphyllus* aphids feeding on *A. campestre* in Cardiff Bay. Full details of this record are published in Baker and Broad (2009).

***Phylloxerina salicis* (Lichtenstein) (Phylloxeridae)**

Observed in 2006 on several young *Salix alba* trees in Barry docks. Aphids were found under wax on the bark of the trunks. Subsequently found in small numbers on the trunks of mature *S. alba* in Cowbridge.

***Pleotrichophorus glandulosus* (Kaltenbach) (Aphidinae: Macrosiphini)**

Three apterae were found in June 2008 on an *Artemisia vulgaris* plant growing on the edge of a pebble beach at The Knap, Barry.

***Pterocallis maculata* (von Heyden) (Calaphidinae: Panaphidini)**

In summer 2006, observed on an *Alnus glutinosa* in Cardiff Bay. Subsequently found on virtually every tree of *A. glutinosa* examined in Cardiff Bay, and also on several *A. incana*. In all cases attended vigorously by the garden ant *L. niger* and producing extensive honeydew. Colonies were frequently dense, sometimes developing on leaf upper surfaces, but more common on leaf undersides and often focusing around leaf mid-ribs. Parasitism by *Trioxys pallidus* and the aphelinid *Aphelinus subflavescens* (Westwood) noted. Previous UK records come from a single site in Suffolk (Stroyan, 1977) and a single site in Warwickshire (Robbins, 1990). Jit Thacker found the aphid on *A. glutinosa* in Norwich, in 2007 (G. W Hopkins, pers. comm.).Whether the species has become more common in the UK in recent years is not known, but it seems likely that the species thrives in warm micro-climates. *Pterocallis alni* (De Geer) was never present on the same *Alnus* trees, but is found commonly on *Alnus* trees in rural environments where *P. maculata* has not yet been found.

***Pterocomma dubium* Borner (Aphidinae: Pterocommatini)**

Feeding at the ends of small diameter *Populus alba* stems, County Hall, Cardiff Bay. Fundatrices emerged in March, around the same time as catkins, and feed

clustered around terminal or lateral buds, giving rise to small colonies without attendant ants. The aphids are difficult to see since their pale coloration blends well with the pale grey, slightly downy ends of *Populus alba* stems. Alatae appear later in the season, but the full life cycle is not known. Wojciechowski (2003) reports a record of four apterae, collected from *P. generosa* at Cambridge, on 21st June 1951.

***Pterocomma pilosum* subsp. *konoi* Hori ex Takahashi (Aphidinae: Pterocommatini)**
Observed since 2007 feeding on *Salix caprea*, *S. alba* and *S. cinerea* at various locations including Merthyr Mawr sand dunes, Bute Park, Cardiff, Cardiff Bay, Barry docks and Porthkerry Park, Barry. In all cases attended by *L. niger*, but one colony at Merthyr Mawr attended by *Lasius fuliginosus* (Latreille) whilst feeding on *S. cinerea*. Feeding on *S. repens* also noted at Merthyr Mawr. Colonies were frequently heavily parasitized by *Aphidius cingulatus* (Ruthe).

***Schizolachnus obscurus* Börner (Lachninae: Cinarini)**
During January 2007, observed feeding on several young *Pinus nigra*, in Barry docks and Cardiff Bay. Subsequently found on mature *P. nigra* in Romilly Park, Barry. Occasionally parasitized by the aphidiid *Pauesia unilachni* (Gahan) and predated by the coccinellids *Anatis ocellata*, *Harmonia quadripunctata* and *Exochomus quadripustulatus*.

***Sipha maydis* Passerini (Chaitophorinae: Siphini)**
Recorded in May 2008, feeding on *Hordeum murinum* plants growing at the edge of a pebble beach at The Knap, Barry, attended by *L. niger*. Recorded in June 2008 feeding on *Dactylis glomerata* in Cardiff Bay, attended by *L. niger*.

***Staegeriella necopinata* (Borner) (Aphidinae: Macrosiphini)**
In May 2007, observed feeding in large numbers on the flowering heads of several *Galium verum* plants growing in unimproved grassland at Porthkerry Park, Barry.

***Thelaxes suberi* (del Guercio) (Thelaxinae)**
Abundant in July 2006 on young *Quercus ilex* in Barry docks and on two mature *Q. ilex* at Roath Park, Cardiff. In both cases the aphids were attended by *L. niger* and were feeding on young growth and developing acorns. Not recorded from this host previously in the UK. Vic Eastop (pers. comm.) reports that apterae and alatae of the species were abundant on *Q. cerris* at Kew, in May 1960 and 1965. The author observed colonies on developing *Q. cerris* acorns on a mature tree in Weston, Bath, in June 2006, but examination of *Q. cerris* in Cardiff failed to reveal any aphids. The species probably requires long periods of hot, dry weather to thrive.

***Tinocallis nevskyi* Remaudiere, Quednau & Heie (Calaphidinae: Panaphidini)**
Observed since 2005, feeding scattered under *Ulmus glabra* leaves, on trees growing in Romilly Park, Porthkerry Park and The Knap, Barry and Casehill Woods, Dinas Powis.

***Trama caudata* (del Guercio) (Lachninae: Tramini)**
First found in June 2007 feeding on underground parts of *Sonchus asper* growing at Merthyr Mawr sand dunes. Subsequently found on underground parts of *S. oleraceus* growing at Cold Knap Point, Barry. In both cases, *L. niger* was attendant.

***Trama maritima* (Eastop) (Lachninae: Tramini)**
Feeding on the same *Sonchus asper* and *S. oleraceus* plants, colonised by *Trama caudata*.

***Trama rara* Mordvilko (Lachninae: Tramini)**

In August 2007 feeding on underground parts of a *Taraxacum* plant growing on 'brownfield' land in Cardiff Bay. Attended by *L. niger*.

Discussion

That 77 aphid species can be recorded new to Wales within four years of collecting, may be explained in part by the general lack of attention paid to aphids by amateur and professional entomologists. Many papers have been published about the minority of 'pest' aphids in the world fauna, but far less attention has been paid to the non-pest aphids that show highly evolved and intimate associations with their host plants, and complex interactions with associated ants, parasitoids, predators and pathogens. This paper is intended to serve as an encouragement for entomologists with a passing interest in aphids, to intensify their studies and actively record aphids on their local patch. Aphids and their associated organisms may be suitable subjects for conservation projects, but until we know much more about their biology, ecology and distribution, we cannot devise accurate lists of threatened species, or give full consideration to practical conservation measures.

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Thanks are due to Professor A. F. G. Dixon, Dr G. W. Hopkins, Jit Thacker, Roger Blackman (NHM), Dr Vic Eastop (NHM), Dr Jon Martin (NHM), Roger Hammon (FERA, Sharon Reid (FERA), Dr Gavin Broad (NHM), Dr Petr Star, John Robbins, Dr Stephan Scheurer, Dr Andrea Binazzi, Dr Richard Harrington (Rothamsted), Dr Mike Wilson, Cho-Kai Chan and all other individuals who have provided encouragement and assistance in my studies of aphids and their associated organisms.

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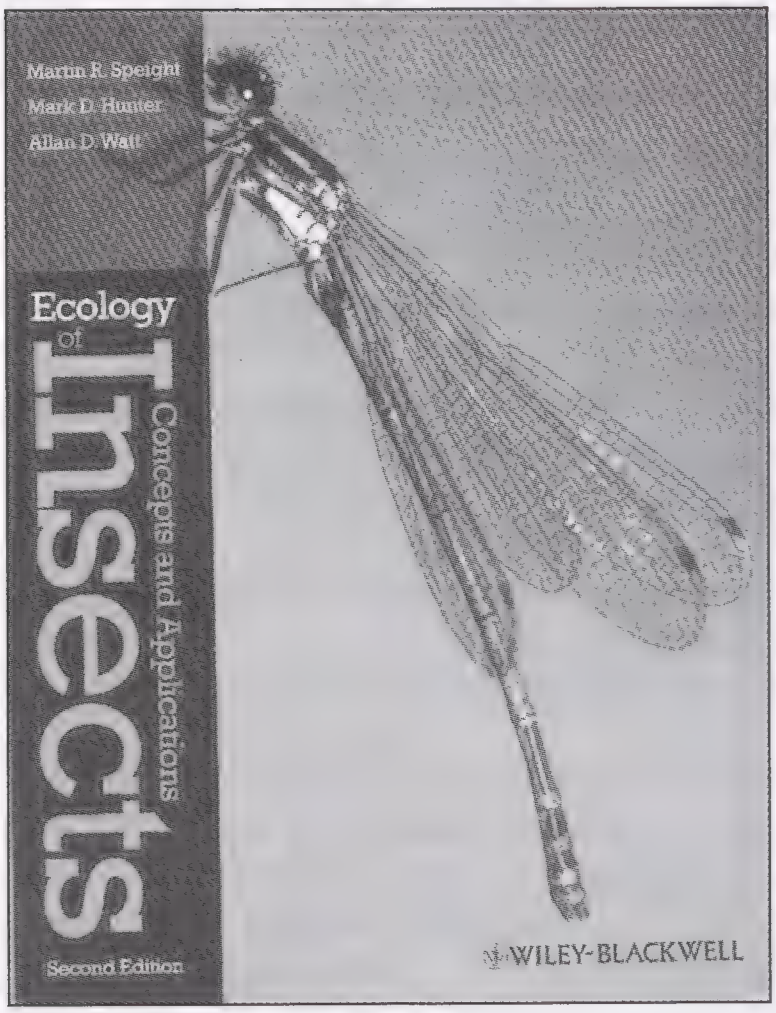
BOOK REVIEW



Ecology of insects: concepts and applications by Martin R. Speight, Mark D. Hunter & Allan D. Watt. Second edition, Wiley-Blackwell, 2008. 628pp. Softcover. £39.99. ISBN 978-1-4051-31114-8.

The new edition of this well-known text book on insect ecology has been worth waiting for. It is unusual in one main respect. More than 80% of entomology books and indeed articles published in this journal are concerned with taxonomy and where species are found. The authors are concerned with describing *what insects do* rather than what their names are. Chapters covered include insect biodiversity, insect herbivores, insects and climate, population dynamics, natural enemies, evolutionary and physiological ecology, insects in ecosystems, insects and diseases, insect pest management and insect conservation. Clearly written, extensively illustrated, more than 600 pages and all for just twice the price of a typical key to British insects.

JOHN BADMIN

AVOIDING DETECTION BY PREDATORS: THE TACTICS USED BY *BISTON BETULARIA* LARVAE

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ABSTRACT

Fourth and fifth instar larvae of the Peppered moth *Biston betularia* (L.) hold their bodies rigid and still during the day which has been hypothesized to enhance crypsis. This twig-like appearance was examined using samples of larvae and twigs from birch and hawthorn trees from two locations in the British Isles. Analysis revealed that there was variation in the angle of the larvae to the stem they were resting on: this adaptation would allow larvae to feed on a variety of host plants whose twig angles differ. This flexibility in the angle of rest of *Biston* larvae, together with their ability to change colour to match their background and to remain still, are adaptations to promote concealment in response to predator selection.

INTRODUCTION

Lepidopterous larvae are a valuable source of protein (Rockstein, 1978; Ramos-Elorduy, 1987; Glen, 2004), and endeavour to avoid detection by predators, especially during the day when visually hunting predators are searching for food. Some species rely on crypsis, such as Grey Mountain Carpet *Entephria caesiata* (D. & S.) which rests on heather *Calluna vulgaris* (L.) during the day. Endler (1984) suggested that larvae, or adults, relying on crypsis have colours which represent random samples of the background where they are resting. This will be effective in a habitat with low heterogeneity but in one with high heterogeneity the prey may need to compromise between being entirely adapted to one habitat or be less well-camouflaged in two or more habitats (Merilaita, Tuomi & Jormalainen, 1999). This may explain the polymorphism for body colours evident in cryptic prey (Sandoval, 1994; Wente & Phillips, 2005) which are the targets of bird and lizard predators. The importance of the distance of the predator from the prey is influential too (Bohlin, Tullberg & Marilaita, 2008), so camouflage may be increasingly effective as distance increases. Other moth species, as larvae, hide in the soil or at the base of vegetation, such as the Large Yellow Underwing *Noctua pronuba* (L.), and some stay inside the vegetation, such as the Goat Moth *Cossus cossus* (L.).

Larvae of the Peppered moth *Biston betularia* (L.) (Noctuidae) remain in the open but show behavioural adaptations. They keep their bodies rigid and motionless and masquerade as a twig, although these tactics are enhanced by cryptic coloration (Fig. 1). The tactics are not unique to *B. betularia*, being observed in various other geometrid larvae (Cott, 1940), such as Scalloped Hazel *Odontopera bidentata* (Cl.) and Canary-shouldered Thorn *Ennomos alniaria* (L.). Whether or not this means that there are bird predators that specialize in looking for twig-like prey is not known, though it might be expected (Staddon & Gendron, 1983). By successfully matching their chosen background in these ways, predations of larvae are lower (Cooper & Allen, 1994).

Biston betularia adults have been intensively studied following research by Kettlewell more than fifty years ago (Kettlewell 1955, 1956, 1973) and more recently

Fig. 1. *Biston betularia* larva resting on hawthorn. Photo: Michael Dockery

by Majerus (1998) and Cook, Riley & Woiwood (2002), but there is less known about the larval stage, and especially their propensity to show behavioural adaptations which work in concert with their coloration. Masquerading as a twig is a successful tactic as Carrick (1936) found in his field experiments. He put out pinned larvae of species such as Early Thorn *Selenia dentaria* (Fabr.) and Brindled Beauty *Lycia hirtaria* (Cl.) and observed how many were taken by small insectivorous birds, including wrens and whitethroats. The percentages of prey taken were much lower than for non-cryptic prey. Later work by de Ruiter (1952), but in a laboratory setting, confirmed these findings with jays *Garrulus glandarius* (L.), which were unable to discriminate between twig-like larvae and the twigs of species on which the larvae usually fed.

Biston betularia larvae are polyphagous, feeding on a variety of food plants including birch, hawthorn, oak, elm, lime, beech, plum and other fruit trees, and ground flora such as bramble and rose (Allan, 1949: Noor, Parnell & Grant, 2008). This is advantageous since they are dispersed by the wind as first instars (Noor, Parnell & Grant, 2008) and so could land on one of a large number of potential host plants. The larvae feed at night and during the day adopt a twig-like appearance. When engaged in this behaviour the larvae keep their prolegs on the twig where they are resting and the rest of their body is held still and rigid at an angle to the twig. Sometimes, if an adjacent twig or leaf is nearby the larva may hold on to this for support. Late instars often produce a silk line, or guy, that extends from the head of the larva to the nearest twig or leaf (B. S. Grant, *pers. comm.*, 2008). Some anecdotal

evidence (B. S. Grant and N. Edmonds, *pers. comms.*, 2008) suggests that the angle of the larva to the twig is relatively constant (40–50°) and this paper aims to assess if this is the case and whether the angle of rest of Peppered moth larvae mimics the angle of the twigs on their food plants. If larvae hold their bodies at a constant angle then it might suggest the mechanism is under genetic control. If there is variation in the angle, with the angle reflecting the angle of twigs on their food plants, or other factors, the mechanism may be under behavioural control.

The aims of the study were threefold:

(i) to determine whether *Biston betularia* larvae show consistency in their angle of rest;
(ii) to determine whether the angle of rest of larvae on hawthorn *Crataegus monogyna* Jacq. and the angle of twigs of hawthorn and birch *Betula pendula* Roth are similar;
(iii) to determine whether the twigs of two of their host plants, hawthorn and birch vary in their angle to the main twigs or branches.

Data were obtained from two locations, Urmston in Manchester (SJ 770097) and Pleinmont on Guernsey (WV 240757), to determine whether twig angles on both species vary spatially.

Methods

The larvae used in this research were obtained from stock at the University of Liverpool and maintained at Urmston, Manchester. They were second or third instars and 4–6 larvae were kept in a series of 500 g margarine tubs, each with plastic netting as a cover to allow for the circulation of air. Fresh food in the form of sections of small twigs of hawthorn was provided each day in a clean tub. After use, all tubs were washed thoroughly and left in a solution of mild sterilizing liquid (Milton) for at least three hours. Larvae were transferred from one tub to another using an artist‘s brush and a 10 ml plastic spoon. After providing larvae with a clean tub and fresh foliage, the containers were left on a table overnight. The following day, between 1400 and 1600 h, the larvae in each tub were inspected to see if they were showing the desired behavioural response, i.e. holding their body still and rigid on a twig. If so, each was carefully removed by hand (MD or JM) and gently placed on a transparent plastic 180° protractor. A digital camera (Nikon Coolpix S9) was used to take a photograph of each larva resting on the protractor. Over a period of three weeks in both August 2008 and 2009 a number of photographs were taken resulting in a sample size of $N = 26$. Each produced a clear image of an individual larva anchored by its prolegs to a section of hawthorn twig and holding its body still and stiff at a constant angle. The twig on which each larva was resting on was aligned to run along the horizontal line on the protractor.

To record the angle of rest of each larva in the sample the procedure illustrated in Figure 2 was used. Each larva was photographed only once.

To check inter-observer reliability (MD and JM), the first 15 photographs were checked separately by each observer: the mean difference in the angles measured was 0.47°. A comparison of the angles of rest of the larvae measured by each observer was made using Cronbach’s alpha (a coefficient of reliability or consistency). This gave a value of 0.99, which is greater than the often quoted value of 0.70–0.80 (Field, 2005) which indicates that the two observers were reading the angles of rest with an acceptable level of reliability. Two of the images are shown in Figure 3.

To make up the sample of twigs, in both Urmston and Guernsey, individual birch and hawthorn plants were selected, without conscious bias, on transects along minor

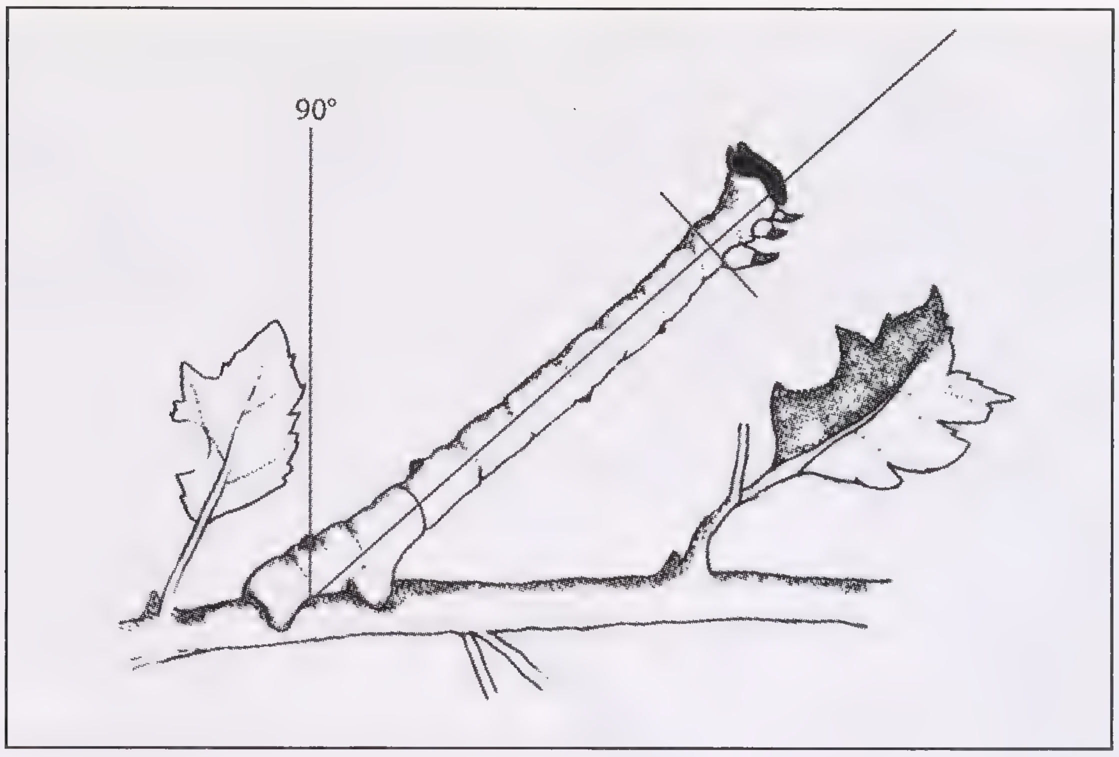

Fig. 2. Drawing of *Biston betularia* larva showing the method for measuring the angle of rest. Drawing: Judy Evans.

(a) (b)

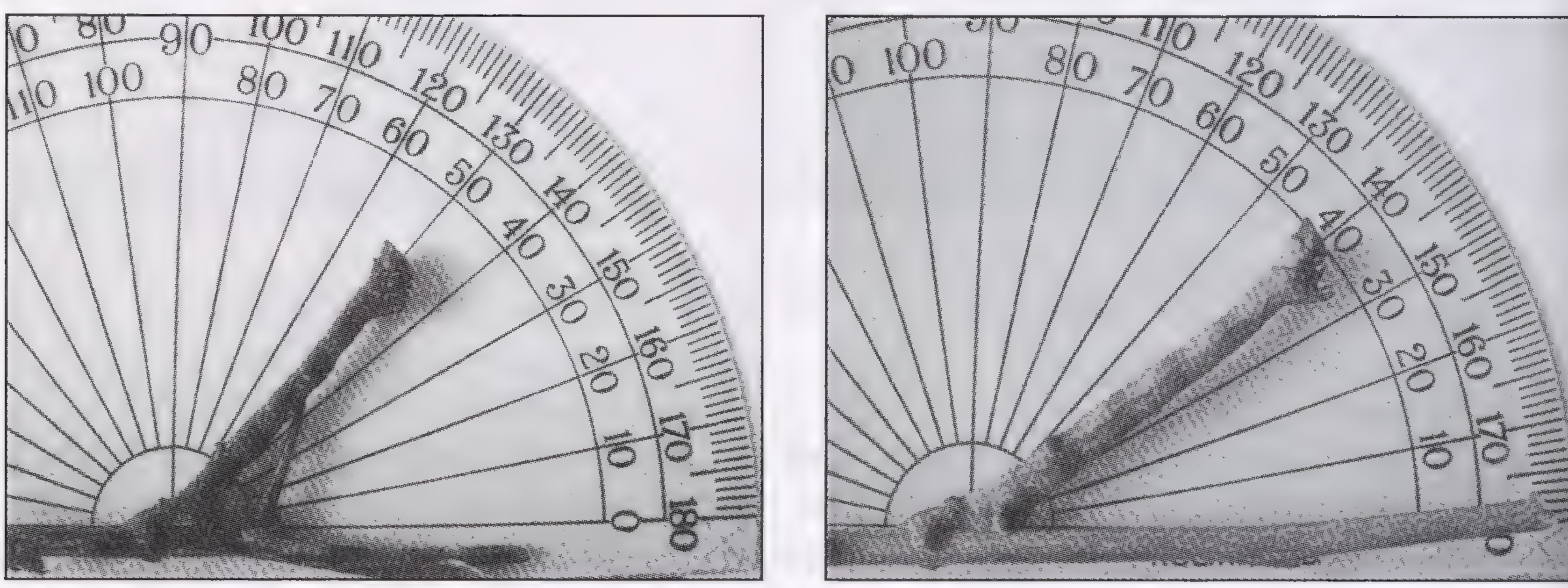

Fig. 3. Two of the images from the sample, showing *Biston betularia* larvae with angles of rest of (a) 50° and (b) 40°. Photographs: Michael Dockery.

roads in the two areas. Peripheral sections of branches (all less that one metre in length and therefore the most recent growth), each with a series of side twigs, were taken to the homes of the collectors (MD and PC) for measurement, Again, a transparent plastic 180° protractor was used to determine the angles, with two measurements of each twig angle made and a mean determined. To assess inter-observer reliability, an arbitrary selection of four hawthorn twig angles and three birch twig angles from Urmston was sent to Guernsey for measurement and the results compared. All the Guernsey measurements were within 1–2° of the Urmston measurements, the mean difference for each twig angle measured being 1.29°, which is close to the acceptable instrument error. The greater difference between the observers for the twig angles, compared with the larval angles of rest, was probably due to the fact that the larval angle of rest was determined with reference to a line drawn to reach the circumference of the protractor whereas the twig had no clear line to indicate its centre, so that each observer had to gauge the centre of the twig.

Analysis

The values of the larval angles and the twig angles for hawthorn and birch, in both Urmston and Guernsey, were assessed to see whether they accorded with the assumptions of normal and similar distributions, using the F-test and the Anderson-Darling test. The results showed a significant difference for two variables and so it was appropriate to use the Mann-Whitney U test for comparisons. The coefficient of variation, which is the standard deviation/mean, was calculated for each set.

Results

The resting angle of *Biston betularia* larvae on hawthorn twigs was proportionally more variable than the angles at which twigs emerged from branches on both plant species at both locations (Table 1). The range in larval resting angles was 56° (i.e. 20°–76°) compared to the ranges of twig angles of between 39° and 43°.

Biston larvae adopted a significantly more acute stance than the angles of side twigs of hawthorn and birch at both locations (Table 2), the mean angles of twigs for both host plants being at least 10° greater than those of the larvae. Further, the angles of birch twigs were also more acute than those of hawthorn twigs at both locations.

The comparisons between the host species (Table 3) showed no significant differences between the two hawthorn samples or the two birch samples at both locations. However, whilst birch and hawthorn samples at Urmston showed no difference in twig angles, with very similar ranges (42° and 43°) and means which differed by only 2.4°, there was a difference in Guernsey (with means which differed by 10.3° but with identical ranges). So the sample of birch from Guernsey showed significantly more acute branching (i.e. a smaller angle) than hawthorn, providing evidence of between-species variability for this character.

Table 1 Resting angles of *Biston betularia* larvae on hawthorn and twig angles of hawthorn and birch from Urmston (Urm) and Guernsey (G). N is the sample size.

Variable	N	Mean	CV (%)	Range
Larval angle (Urm)	26	41.2	33.3	20–76 (56)
Hawthorn twig angle (Urm)	28	59.3	18.2	37–80 (43)
Hawthorn twig angle (G)	29	62.4	18.4	43–82 (39)
Birch twig angle (Urm)	38	57.0	15.7	29–71 (42)
Birch twig angle (G)	30	52.0	19.5	30–69 (39)

Table 2 Differences between the angles of rest of *Biston betularia* larvae and the angles of twigs on both host plants in both locations, as measured by Mann-Whitney U test, with U values and sample sizes quoted. Probability levels: $^{*}P<0.05$, $^{**}P<0.01$ and $^{***}P<0.001$. Urm – Urmston, G – Guernsey, Haw – Hawthorn, Bir – Birch.

Larval angles and Haw twig angles in Urm:	U = 456.5, N = 26, N = 28, $P<0.001^{***}$
Larval angles and Bir twig angles in Urm:	U = 513.5, N = 26, N = 38, $P<0.001^{***}$
Larval angles and Haw twig angles in G:	U = 443.0, N = 26, N = 29, $P<0.001^{***}$
Larval angles and Bir twig angles in G:	U = 536.0, N = 26, N = 30, $P<0.001^{***}$

Table 3 Differences between the angles of twigs on plant species measured by the Mann-Whitney U test, with U values and sample sizes quoted. Probability levels: $*P<0.05$, $**P<0.01$ and $***P<0.001$. Urm – Urmston, G – Guernsey, Haw – Hawthorn, Bir – Birch.

Plant species		
Hawthorn:	Urm – G	U = 755.0, N = 28, N = 29, $P>0.05$
Birch:	Urm – G	U = 1466.5, N = 38, N = 30, $P>0.05$
Locations		
Urmston	Haw – Bir	U = 998.5, N = 28, N = 38, $P>0.05$
Guernsey	Haw – Bir	U = 1069.5, N = 29, N = 30, $P<0.01$ **

Discussion

The twig-like appearance of larvae of *B. betularia* and their tendency to rest at an angle, holding on to the branch by their prolegs, are clearly adaptive features designed to improve concealment. These characteristics are present in a number of other species in the subfamily Ennominae to which they belong (Cott, 1940). The association of behaviour with morphology suggests that the stance adopted is innate and a response to predator selection. Nevertheless, the results show variation in the individual angle adopted, in contrast to the anecdotal evidence of Grant (2008) and Edmonds (2008). This phenotypic plasticity may itself be adaptive, allowing the larvae to match themselves to the plant on which they are living. This would parallel their ability to match their background in colour (Noor, Parnell & Grant, 2008). It is to be expected, however, that the preferred resting angle would most closely match the twig angle on the principal food plant of the larvae. If that is so, then hawthorn and birch are not species on which this adaptation has developed, since they both branch at angles significantly greater than those adopted by the larvae.

An interesting and unexplained finding, which complicates the picture, is that although there is no difference in twig angles of the two plant species between the two locations, a significant difference was found between the plant species at Guernsey but not at Urmston. Clearly more information is needed on variation in twig angles within and between plant species. Larvae could, for example, be kept on artificial branches where twig angle could be varied at will, to see whether any direct behavioural response occurs to match the insect to a changed background.

In conclusion, *B. betularia* larvae mimic twigs to avoid predator attack, especially from birds. The angle of a larva to the stem it rests on varies, so the angle seems unlikely to be critical, though it would enable larvae to feed on host plants with varying twig angles. Being the right colour and keeping still achieves the masquerade.

Acknowledgements

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SHORT COMMUNICATIONS

***Syntretus breviradialis* van Achterberg & Haeselbarth (Hymenoptera: Braconidae), new to Britain.** – From 2005–2006, I ran two Malaise traps in Monks Wood National Nature Reserve (VC 31, TL202805), mainly to sample Ichneumonidae and Braconidae. The full results will be written up when all the samples have been identified or sorted to morphospecies but I thought it worthwhile recording a specimen of *Syntretus breviradialis* van Achterberg & Haeselbarth in a Malaise trap sample from 26 May to 3 June 2005. This was a trap run intermittently over some dead wood in an area of ancient woodland dominated by ash (*Fraxinus excelsior*), with some elm (*Ulmus* sp.) and other trees. The European species of *Syntretus* were

recently revised (van Achterberg & Haeselbarth, 2003), resulting in six species new to Britain, of a total of 13 species (with one excluded) (see Broad, Shaw & Godfray, 2009). However, *S. breviradialis* was not amongst these and has hitherto been known only from the holotype specimen, collected in Austria. The Monks Wood specimen agrees well with the holotype female and keys out readily using van Achterberg & Haeselbarth's key. The ovipositor sheaths of the holotype are broken, resulting in their drawing and description depicting these as too short and wide. Where known, *Syntretus* species are parasitoids of adult Hymenoptera (bees and Ichneumonidae) although most species, including *S. breviradialis*, have yet to be reared.

I am grateful to Natalie Dale-Skey for mounting many specimens from Monks Wood, and to Dr Max Fischer (Naturhistorisches Museum, Austria) for the loan of the holotype. – GAVIN R. BROAD, Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5BD; email: g.broad@nhm.ac.uk

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Broad, G. R., Shaw, M. R. & Godfray, H. C. J. 2009. Checklist of British and Irish Braconidae (Hymenoptera). Web publication available at: http://www.nhm.ac.uk/resources-rx/files/braconidae-checklist-final-34139.pdf

Spread of L-album Wainscot (Lepidoptera: Noctuidae) in north Kent in 2009. – This year has seen a substantial increase in first records of L-album Wainscot *Mythimna l-album* (L.) in north Kent indicating that the moth may be spreading locally, though it is impossible from light-trap records alone to determine whether the sightings are due to individuals from established colonies or migration. The following records are known:

Minster, Sheppey, first recent record, 8.vii.2009, G. N. Burton; Perry Wood, Selling, first record, 28.viii.2009, J. Badmin; Ospringe, singletons on 10.ix.09 and 11.ix.09, first records, D. W. Jenner; Boughton under Blean, 10.ix.2009, first record 6.x.2008, P. Maton: Newington, 7 individuals 14.ix.–30.ix.2009, recorded in previous years, P. J. Jewess; Challock, one on 26.ix.2009, several individuals recorded in 2007 and 2008, R. Jordan.

It is interesting to note that a specimen of Clifton Nonpareil *Catocala fraxini* (L.) was recorded in the light-trap at Challock on the same night as the record of *M. l-album* indicating that a migration was probably taking place at this time. – DON JENNER, Kennaways, Ospringe, Faversham, Kent ME13 0HA & PHILIP JEWESS, Boyce's Cottage, Newington, Sittingbourne, Kent ME9 7JF.

Late occurrence of froghopper spittle in Kent. – Spittle masses produced by the developing nymphs of the spittlebug *Philaenus spumarius* (L.) (Aphrophoridae) are a common sight in June and July. This species is reckoned to be univoltine throughout its natural range. It was therefore interesting to observe at least ten spittles of late instar nymphs of this species feeding on rosemary *Rosmarinus officinalis* in Norman Heal's garden in Faversham, east Kent through August to at least as late as 18 September 2008. – JOHN BADMIN, Coppice Place, Selling, Kent ME13 9RP.

FIVE APHID PARASITOIDS (HYMENOPTERA: BRACONIDAE: APHIDIINAE) NEW TO BRITAIN

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Abstract

Five species of aphid parasitoids are reported new to Britain on the basis of rearings. *Adialytus salicaphis* (Fitch) was reared from *Chaitophorus capreae* (Mosley) and *Chaitophorus leucomelas* Koch; *Aphidius setiger* Mackauer was reared from *Periphyllus* sp.; *Praon bicolor* Mackauer was reared from *Eulachnus rileyi* (Williams); *Praon spinosum* Mackauer was reared from *Subsaltusaphis picta* (Hille Ris Lambers) and *Trioxys falcatus* Mackauer was reared from *Periphyllus* sp. Notes are given on an additional specimen of *Ephedrus niger* Gautier, Bonnamour & Gaumont, recently reported as new to Britain. Notes on the host foodplants and associated hyperparasitoids are given.

Introduction

The Aphidiinae are all, where known, endoparasitoids within aphids. The host bodies are melanised by the aphidiine larva, producing characteristic mummies, which, together with the position of the adult emergence hole, often offer valuable identification hints. Whilst some species are virtually host species-specific, others are generalists, but usually within a particular habitat. Identification can be difficult, particularly of non-reared specimens, as the adults offer rather few discrete morphological characters. The Aphidiinae are a distinctive subfamily of Braconidae and can be recognised using the keys in Shaw & Huddleston (1991), van Achterberg (1993) or Sharkey (1997). Shaw & Huddleston (1991) present a very useful summary of the biology of aphidiines. Aphid primary parasitoids (principally aphidiines, also *Aphelinus* (Chalcidoidea: Apelinidae)) suffer high levels of hyperparasitism, both by true hyperparasitoids, which oviposit into the primary parasitoid larva within the host, and by pseudohyperparasitoids, which attack the primary parasitoid only once it has finished feeding on the host. True hyperparasitoids include *Alloxysta* (Cynipoidea: Figitidae: Charipinae) whilst pseudohyperparasitoids include *Dendrocerus* (Ceraphronoidea: Megaspilidae), which can attack true hyperparasitoids, and other pseudohyperparasitoids. Species of these genera are very frequently reared from aphids.

Like their aphid hosts, the Aphidiinae are an under-recorded group in Britain. Most work on aphid parasitoids in Britain has been undertaken in relation to Integrated Pest Management for agricultural crops. Consequently, whilst the diversity and ecology of parasitoids associated with pest aphids is relatively well known, that of non-pest aphids is little known, and there is considerable potential for new discoveries to be made, as is demonstrated here.

Material and Methods

Parasitoid adults were reared by the first author from aphid mummies retained on sections of host plant and placed in clear plastic containers stored at room temperature. Specimens are deposited in National Museums Wales (Cardiff) and the Natural History Museum (London) (BMNH). Aphids and parasitoids (the latter provisionally) were identifed by the first author, with parasitoid identifications confirmed by the second author. Useful sources for aphid identification are Blackman & Eastop (1994, 2006). For identification of Aphidiinae, Starý (1966) is a good starting point; further references are given in the text. Hyperparasitoids were identified using Graham (1969) (*Asaphes*) and Fergusson (1986) (*Alloxysta*: but note that the British fauna is now much better known, van Veen, 2009). Images of uncoated specimens were taken using a Leo 1455VP low vacuum scanning electron microscope at the Natural History Museum.

The Parasitoids

Adialytus salicaphis (Fitch)

In autumn 2007, cream-coloured aphid mummies were found on a bush of *Salix caprea* growing in an area of amenity landscaping in Cardiff Bay, Cardiff, Wales, and upon which the aphid *Chaitophorus capreae* (Mosley) was feeding. Six wasps emerged, comprising five hyperparasitoids that left ragged exit holes, and one primary parasitoid that left a clean, circular exit hole. The primary parasitoid was identified as a female *Adialytus salicaphis* (Fitch) and the hyperparasitoids were identified provisionally as three females and two males of *Alloxysta macrophadna* (Hartig) (Figitidae: Charipinae).

In summer 2008, cream-coloured aphid mummies were found by the first author on the undersides of the leaves of a *Populus* tree in a car park in Cardiff Bay, and upon which the aphid *Chaitophorus leucomelas* Koch was feeding. Two wasps emerged, both primary parasitoids, leaving clean, circular exit holes. Both wasps were identified as female *A. salicaphis*.

Adialytus salicaphis is new to Britain, but according to Fauna Europaea (http://www.faunaeur.org) is recorded from several European countries, including nearby countries such as The Netherlands, France and Germany. It is likely that the species is common in Britain, but has been overlooked, since several species of its *Chaitophorus* hosts are common in Britain on *Salix* and *Populus*. Tomanović *et al.* (2006) reported *A. salicaphis* as the most frequently sampled aphid parasitoid on *Salix* and *Populus* in south-eastern Europe.

The only other *Adialytus* species so far found in Britain, *A. ambiguus* (Haliday), is a parasitoid mainly of *Aphis* species and is best separated from *A. salicaphis* by the presence of some erect hairs on the hind tibia (versus adpressed in *A. salicaphis*) and the shorter first flagellomere [c.2 × longer than apically wide (Fig. 1), versus c.3 × in *A. salicaphis* (Fig. 2)]. In older publications, the species of *Adialytus* were included in *Lysiphlebus* but the two genera are now generally separated (e.g. van Achterberg, 1997) on the basis of the reduced wing venation of *Adialytus* (fore wing veins m–cu and r–m completely absent, as opposed to m–cu, partly, and r–m present in *Lysiphlebus*).

Aphidius setiger Mackauer

In autumn 2007, cream-coloured aphid mummies were collected, primarily from the leaf undersides, but also the upper leaf surfaces, of an *Acer campestre* tree

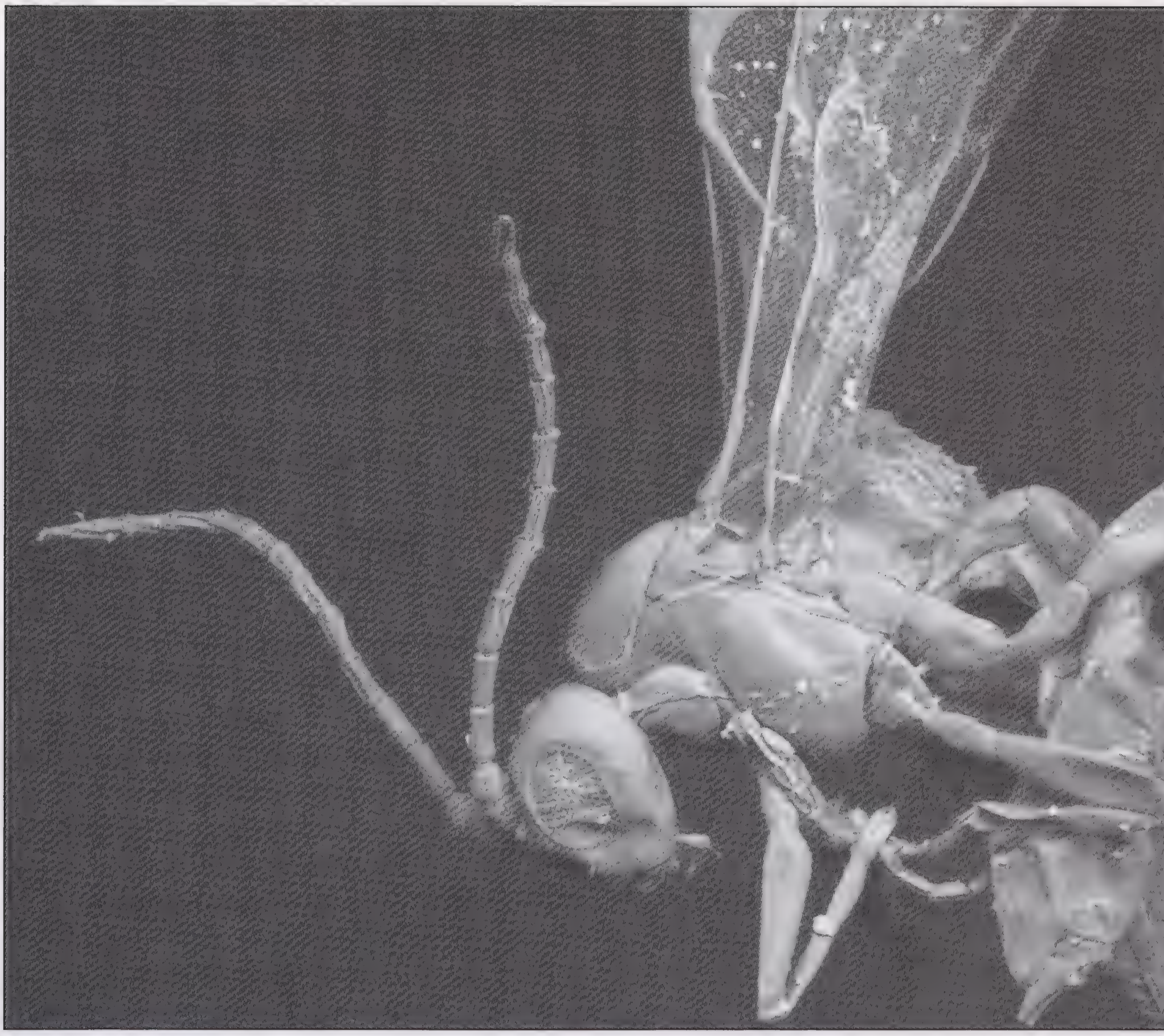

Figure 1. *Adialytus ambiguus* female, showing short first flagellomere of antenna (specimen ex *Aphis farinosa* Gmelin on *Salix*, Harpenden, 1955, in BMNH); wing length 1.55 mm.

growing in an area of amenity landscaping near County Hall, Cardiff Bay, and upon which the aphids *Periphyllus hirticornis* (Walker) and *Periphyllus testudinaceus* (Fernie) were feeding, attended by the ant, *Lasius niger* (L.). Eight wasps emerged, comprising seven hyperparasitoids that left ragged exit holes, and one primary parasitoid leaving a clean, circular exit hole. One hyperparasitoid was identified provisionally as a female *Alloxysta brevis* (Thomson) (Figitidae: Charipinae), with the remaining specimens comprising one female and four male *Asaphes vulgaris* (Walker) (Chalcidoidea: Pteromalidae). The primary parasitoid was identified as a female *Aphidius setiger* (Mackauer).

Aphidius setiger is new to Britain but, according to Fauna Europaea, is recorded from several European countries including neighbouring France, Germany and The Netherlands. The *Periphyllus* hosts of *A. setiger* are common on *Acer* species in Britain and mummies of identical appearance to those on *A. campestre* have been observed by the first author on *A. platanoides* in Cardiff, where the aphid *P. lyropictus* (Kessler) was feeding. It is likely that *A. setiger* is common in Britain but has been overlooked. Starý (1972) provides details on the ecology of *A. setiger* and two other specialised parasitoids of *Periphyllus* aphids, *Praon silvestre* Starý and *Trioxys falcatus* Mackauer. *Praon silvestre* is not known from Britain and *T. falcatus* is reported new to Britain in this paper.

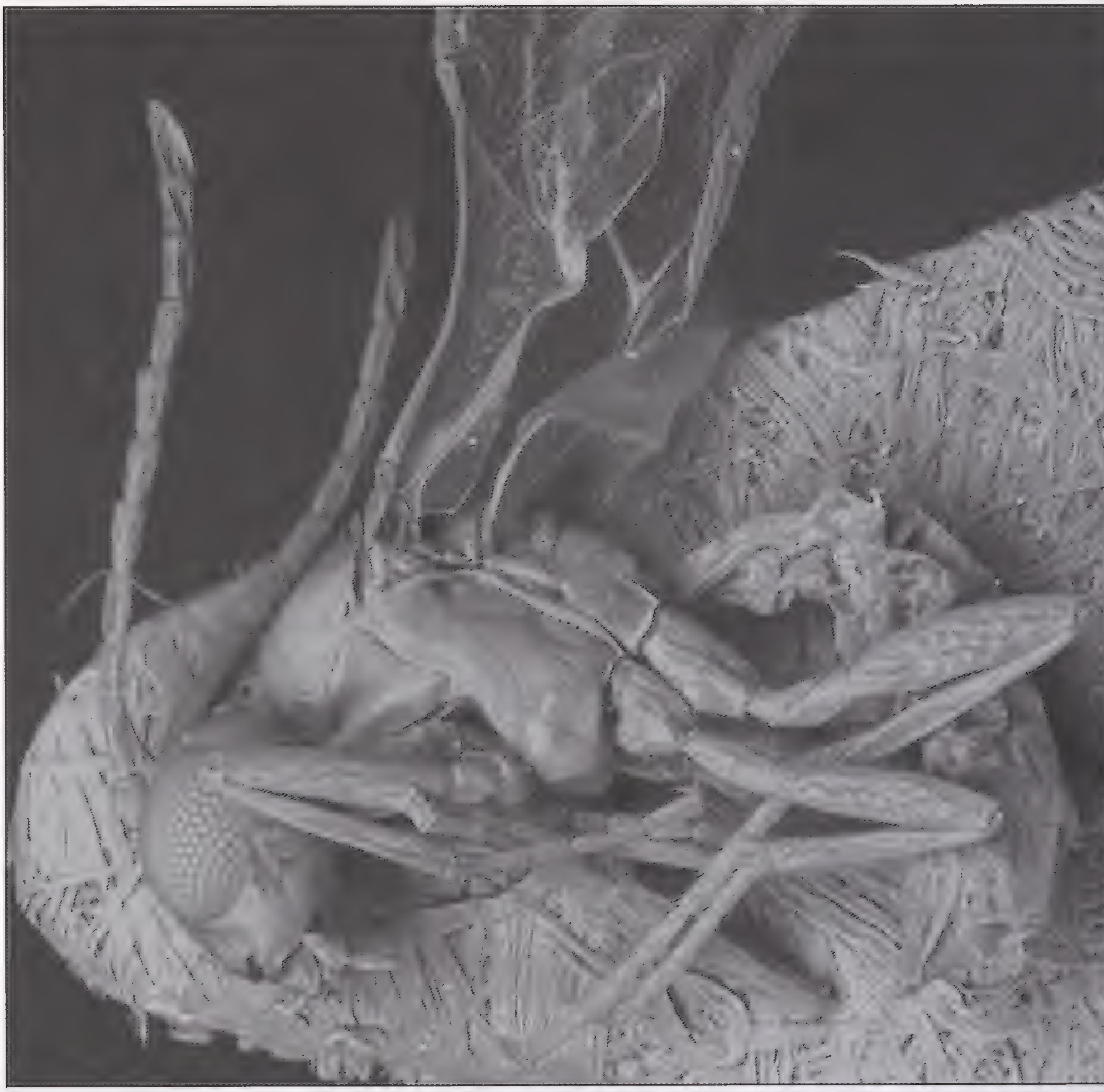

Figure 2. *Adialytus salicaphis* female, showing longer first flagellomere of antenna (specimen ex *Chaitophorus leucomelas* on *Populus*, Cardiff Bay, 2008, in BMNH); wing length 1.35 mm.

Compared to other British *Aphidius* species, *A. setiger* can best be identified by the combination of the first tergite laterally with numerous, fine costulae (the closely spaced ridges on Fig. 3); rather short antennae, with 14–16 segments in the female (14 in the Cardiff specimen); strongly narrowed temples, in dorsal view (Fig. 4); acutely pointed ovipositor sheaths; and host association. *Aphidius setiger* was originally described in the genus *Euaphidius*. At various times, *Euaphidius* has been treated as a valid genus, a subgenus of *Aphidius*, or as a straight synonym of *Aphidius*. Here we follow the most recent catalogue (Yu *et al.*, 2005) and treat *A. setiger* as a species of *Aphidius*. According to van Achterberg (1997), *Euaphidius* can be distinguished from *Aphidius* by the presence of a pair of deep, median depressions on the pronotum and by the long tarsal claws, as long as or longer than the arolium (versus absence of pits, or pits in a different position, and claws slightly shorter than the arolium in the remaining *Aphidius*), but these characters can be hard to see.

Figure 3. *Aphidius setiger* female, lateral view of metasoma, showing costulae on side of first tergite (specimen ex *Periphyllus* sp. On *Acer campestre*, Cardiff Bay, 2008, in BMNH); wing length 2.30 mm.

Figure 4. *Aphidius setiger* female, head in dorsal view, showing narrow temples (same specimen as in Fig. 3).

Ephedrus niger Gautier, Bonnamour & Gaumont

From 2003–2006, the second author identified ichneumonoid Hymenoptera from a Rothamsted light trap run at Monks Wood National Nature Reserve (Huntingdonshire, TL199798). Amongst many interesting finds, a female of *Ephedrus niger* was identified from one sample, collected on 12 August 2004. Van Veen *et al.* (2008) have recently recorded *E. niger* and *E. cerasicola* Starý from Berkshire (Silwood Park), in their long-term studies of aphid food webs associated with a wet meadow. Both species are new to the British list. The European species of *Ephedrus* were revised by Gärdenfors (1986) and *E. niger* can be identified fairly readily using that work. The species has been recorded from a large number of countries in Europe and Asia, including neighbouring countries such as France and the Netherlands (Yu, van Achterberg & Hortmann, 2005). Gärdenfors (1986) reports *E. niger* to be active as an adult in late summer, as a parasitoid of *Macrosiphoniella* and *Uroleucon* species on Asteraceae and Campanulaceae.

Praon bicolor Mackauer

In early October 2009 the first author found two mummies of *Eulachnus rileyi* (Williams) on needles of a young *Pinus nigra* ssp. *nigra* growing in a landscaping bed adjoining a car-park in Cardiff Bay and one mummy of *E. rileyi* on a mature *P. nigra* ssp. *nigra* in Romilly Park, Barry. The mummies were characteristic of a *Praon* species with the pale coloured aphid bodies elevated above a basal cocoon. Two wasps emerged from the Cardiff Bay mummies on 25 October 2009 and both were identified as female *P. bicolor*, new to the British fauna. On 27 October 2009 a single male *P. bicolor* emerged from the Romilly Park mummy.

Fauna Europaea records *P. bicolor* from the Czech Republic, France, Germany, Hungary, Latvia, Republic of Moldova, Central Russia, Sicily, Slovakia, Spain and the countries making up the former Yugoslavia. It is likely that *Praon bicolor* is more widespread in Europe, possibly present wherever *Eulachnus* aphids are found, but is overlooked due to its low effectiveness. No other *Praon* species are known to parasitize *Eulachnus* in Europe, so it is unlikely to be confused with other species and the form of the *Praon* mummy should enable separation in the field from other parasitoids of conifer feeding aphids.

Starý (1966) describes *P. bicolor* as a specialised parasite of *Protolachnus* (= *Eulachnus*) species and states that 'effectiveness seems to be small as parasite cocoons were observed to be very spread on a pine tree'. Although *E. rileyi* was abundant on *P. nigra* ssp. *nigra* in Cardiff Bay, detailed searches revealed only two mummies. Examination of young *P. nigra* ssp. *nigra* in Barry docks, also harbouring large populations of *E. rileyi*, revealed no mummies.

One possible reason for the apparent low effectiveness of *P. bicolor* is the defensive behaviour of *E. rileyi*. It was observed that very slight disturbance of a needle harbouring *E. rileyi*, resulted in aphids in all stages of development, but particularly adults, running quickly down the needle towards its point of attachment. In a study of the only other specialized parasitoid of *Eulachnus* in Europe, *Diaeretus leucopterus* (Haliday), Murphy and Völkl (1996) found that 16.5% of aphids encountering the parasitoid left their feeding site and ran away quickly, and fourth instar larvae or adults were much more likely to run away than younger stages. Parasitoids attacked 56% of aphids which ran away, and pursued running aphids, but whilst 37.1% of attacks on aphids which did not run resulted in oviposition, only 9% of attacks involving pursuit resulted in oviposition.

Praon spinosum Mackauer

In April 2009 pale-coloured mummies of *Subsaltusaphis picta* (Hille Ris Lambers) were noted on the sedge *Carex riparia* at Cosmeston Park, Penarth, in the Vale of Glamorgan, Wales. Two mummies were on leaves and the third was on a flowering head. The mummies were characteristic of a *Praon* species, with the aphid body elevated above a basal cocoon. The emergent wasps were identified as a female and two males of *P. spinosum*, new to the British fauna.

Tomanović *et al.* (2007) report that *P. spinosum* has rarely been collected in the Palaearctic but is widely distributed, from Finland to Serbia and Montenegro. Tomanović *et al.* (2007) suggest that *P. spinosum* is associated with montane swamps and moors in Europe and that its biogeographical distribution falls into the 'Southern-Northern' group of aphidiine wasps that presupposes a glacial origin of the aphidiine species and associations. The habitat in which *P. spinosum* was found in Wales consists of a lowland *Phragmites* bed in a popular country park, with the sedge C. *riparia* present growing at the edge of a board-walk through the *Phragmites*.

Mackauer & Starý (1967) list *Thripsaphis* sp., in addition to *Subsaltusaphis* sp., as hosts for *P. spinosum*. All species in these genera are specialist feeders on *Carex* spp.

It is likely that *P. spinosum* is native to Britain but has been overlooked. The distribution, diversity and ecology of *Subsaltusaphis* aphids in Britain is little known, and even less is known about associated aphidiine parasitoids. Mackauer & Starý (1967) list *Trioxys macroceratus* Mackauer and *Diaeretellus macrocarpus* Mackauer, in addition to *P. spinosum*, as parasitoids of *Subsaltusaphis* sp., though only *T. macroceratus* appears on the British list.

Trioxys falcatus Mackauer

In May 2009 dark brown/black-coloured mummies of *Periphyllus* aphids were noted on the leaf undersides of *Acer platanoides* in Cardiff Bay and an *Acer saccharinum* in Romilly Park, Barry, Wales. The aphids *P. aceris*, *P. lyropictus* and *P. testudinaceus* were feeding on *A. platanoides* and *P. acericola* and *P. testudinaceus* were feeding on *A. saccharinum*. The emergent wasps were identified as female *T. falcatus*, new to the British fauna.

Fauna Europaea records *T. falcatus* from Austria, Czech Republic, France, Germany, Italy, Latvia, Lithuania and the former Yugoslavia, though it is almost certainly widespread across the whole of Europe, but overlooked.

The *Periphyllus* aphids are specialised feeders on *Acer* species and their associated parasitoid fauna in Europe is well known, comprising *Aphidius setiger*, *Praon silvestre*, *Trioxys falcatus* and *Aphelinus flavus* (Nees) (Chalcidoidea: Aphelinidae). All of these parasitoids, except *P. silvestre*, are now known from Britain, but work is required to establish precise parasitoid associations amongst different *Periphyllus* species. Based on the observations from Wales, *T. falcatus* may be the most common parasitoid of *Periphyllus* aphids in spring and early summer, *A. setiger* possibly being more prominent later in the season.

Discussion

Little is known about the diversity, distribution and ecology of aphid parasitoids in Britain, except for species associated with pest aphids in agricultural environments. The species discussed in this paper are probably both native and, possibly with the exception of *P. spinosum*, common, but have been overlooked, perhaps

because they have no impact on agricultural pest aphids. However, *A. salicaphis* could play a minor role in biological control programmes associated with the commercial growth of *Populus* and *Salix* as biomass crops.

Britain has a diverse aphid fauna. Fauna Europaea lists 732 (sub) species. In comparison, only 63 Aphidiinae species are shown on the Fauna Europaea list, though 81 species (including those added here) are listed in a draft checklist of the Hymenoptera of Britain and Ireland, which is in preparation by the second author. For the Czech Republic, 748 aphid species are listed and 123 Aphidiinae. Whilst the actual number of aphid species available to parasitoids in Britain and the Czech Republic is likely to be somewhat less than these figures suggest, nevertheless, the Aphidiinae fauna in Britain, according to Fauna Europaea, is only just over half that of the Czech Republic, despite the aphid faunas being very similar. It is likely that intensive study of aphid parasitoids in Britain will be repaid by unearthing many species new to the fauna, new host-parasitoid associations and possibly new hyperparasitoid species and associations.

Acknowledgements

The authors are grateful to Mark Shaw for critically reading the manuscript and to Julian Bull, who kindly sorted the Hymenoptera from many Monks Wood light trap samples.

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Records of Western Conifer seed bug *Leptoglossus occidentalis* (Hemiptera: Coreidae) in Kent 2008–2009. – This autumn the Kent & Medway Biological Records Centre has received a considerable number of additional records of the Western Conifer seed bug *Leptoglossus occidentalis* Heidemann in Kent following the first sighting of this remarkable insect at Dungeness Bird Observatory, East Kent (VC 15) by David Walker in August 2008 (see Clancy, 2009). The first recorded observation of this species in Britain was from Dorset in January 2007 and a map summarising the sightings of this species in 2008 was produced by Malumphy *et al.* (2008). At least 19 individuals were sighted this year, compared to six in 2008, suggesting that the bug is migrating across the Channel in increasing numbers and is likely to eventually establish itself here. All but two of the records were at light, or by a lighted window, so the insect has yet to be found in natural pine habitat. No sightings have been made at Bedgebury Pinetum where pines are kept under inspection and one might expect to discover this species (C. Reynolds, *pers. comm.*) Most of the records are from coastal sites where light-traps have been operated for the purpose of observing migrating Lepidoptera, but this year there have also been several inland sightings (Fig. 2). Light-trap records refer to the night on which the coreid bug was flying.

Fig. 1. Western Conifer Seed bug *Leptoglossus occidentalis*. Photo: Ann Prichard.

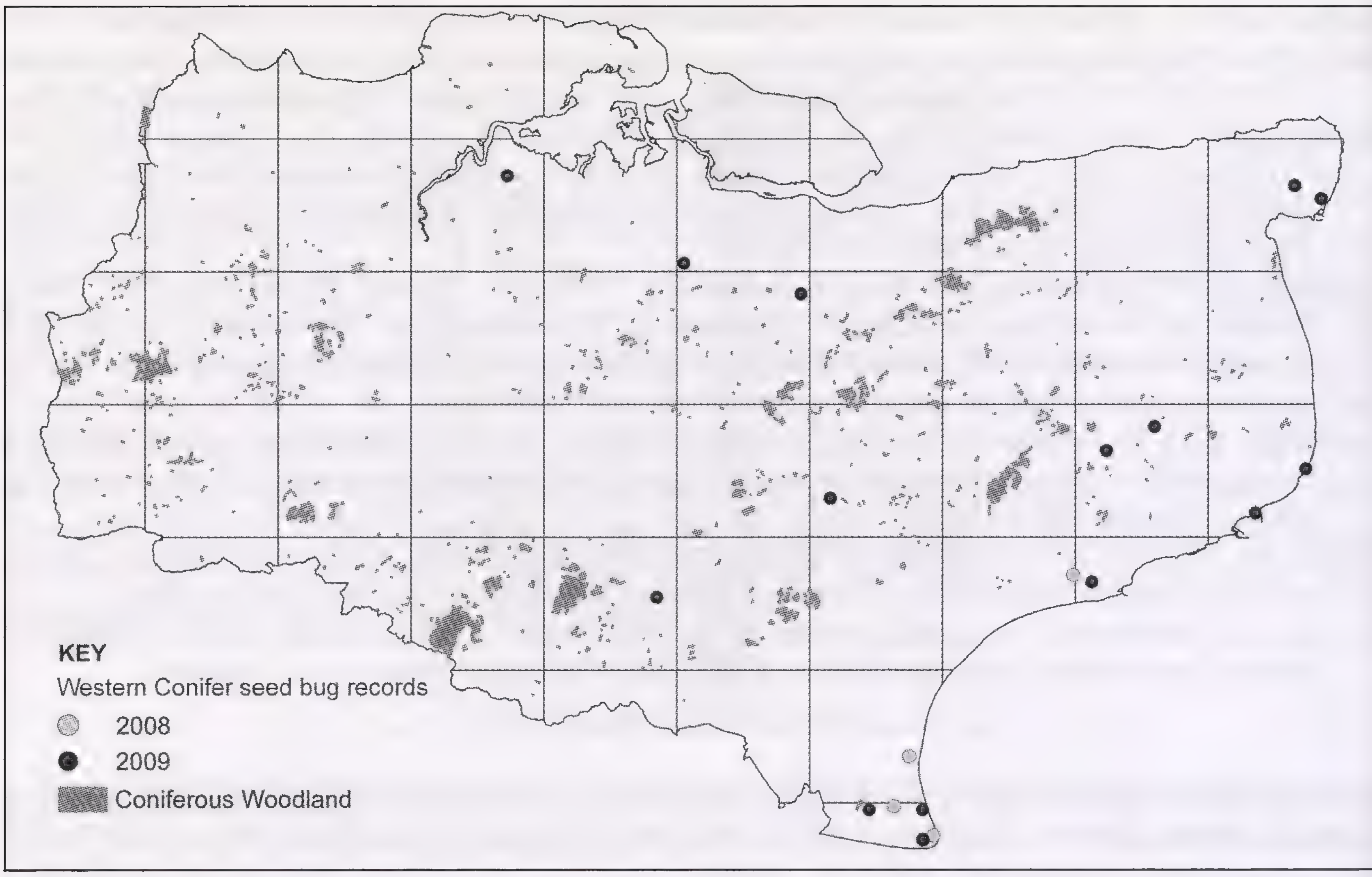

Fig. 2. Western Conifer seed bug *Leptoglossus occidentalis* records for Kent 2008–2009. Prepared from data held by Kent & Medway Biological Records Centre. Habitat data from Kent Habitat Survey 2003, © Kent County Council.

2008 – Dungeness Bird Observatory (TR085172), 30.viii.2008, first Kent records (2 individuals), D Walker; Dungeness, Boulderwall Farm (TR063197), 30.viii.2008, one at light, RSPB; Greatstone (TR0723)(1), 13.x.2008 B. Banson; Dungeness, Southview Cottages, (TR093175) 14.x.2008, one at house, D.Bunney; Folkestone (TR198371) 19.x.2008, one individual on car, Y. Mwalwa.

2009 – Dungeness Bird Observatory (TR085172) 31.viii.2009 (2) & 7.ix.2009 (1), D. Walker; Painter's Forstal (TQ993583) one at mv light, 31.viii.2009, D. W. Jenner; St. Michael's, Tenterden (TQ8835) (1) 31.viii.2009, G. Hollamby; Ashford (TR015429), 1.ix.2009 (1) J. R. Russell; Gillingham (TQ772672) 2.ix.2009, one at window, S. Hale; Newington, Ramsgate (TR3666), 18.ix.2009 (1), P. Milton; Dover Docks (TR335418), 8.ix.2009 (1) P. Eyden; Bockhill, St Margarets at Cliffe, (TR373451), 19.ix.2009, 3 individuals at light, J. S. Russell & J. Chantler; Woodstock, Sittingbourne (TQ905606) 24.ix.2009, one at window, A. Lines; Shepherdswell (TR259483), 27.ix.2009 (1), P. Chantler; Lydd, (TR0419) 10.x.2009, one individual identified by D. Walker; Broadstairs, Thanet (TR3865)(1), 11.x.2009, S. Thompson; Folkestone Harvey Grammar School (TR212366), 15.x.2009, one individual found dead in classroom, J. S. Russell; Lydd-on-Sea (TR0819) 31.x.2009, one found by S. & D. Bunney; Wootton (TR223465) 3.xi.2009, one at house window, A. Prichard. – TONY WITTS, Kent & Medway Biological Records Centre, Brogdale, Faversham, Kent ME13 8XZ & JULIAN RUSSELL, Stone Street, Faversham, Kent.

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OBITUARY

REGINALD ARTHUR BELL
1950–2009

Reg as he was known among his small circle of friends in the British Entomological & Natural History Society passed away on 5th July 2009, being aged only 59 years. To many entomologists on the Hampshire scene, he was also a familiar name.

He was born in Winchester and spent the whole of his life there; if not within the city boundary, then at Sparsholt nearby, and it was here that he became well known for the remarkable migrants that turned up annually in his garden light-trap, perhaps his most memorable being a female *Megalographa biloba* (Stephens) (Stephens' Gem) from which a fine series was bred.

His first attempt at making his way in life was as an electrician, but he was a very independent individual and could not stand the constraints of paid employment, so he opened a shoe sale business which flourished until he was driven out of the premises he occupied by unfair competition. He then turned to finance and after a series of self-employed jobs within a larger organisation, he eventually became a highly successful mortgage broker in his own right with a very loyal following.

Of more interest to us is his life in the world of Natural History and fortuitously, he was an avid diary keeper. His first entry is interestingly dated 6th Jan. 1965 and simply states "Got a pheasant up Farley Mount." The entry on the next day says: "Had pheasant for dinner." (He was fifteen years old then). After this the diaries record over the years, his keen interest in ornithology and fishing in which he recorded every bird he saw and the weight and species of every fish he caught and commented on their taste or the price he sold them for. The first mention of Lepidoptera was in 1972 when he recorded the pupae he was overwintering, all of which were hawkmoths. He also stated that he went fishing 61 times that year, but after this, the birds and fish began to take a back seat since he mentions on the 10th March that "he had got his first moth trap today and would be trying it tonight." Then he plunged into the world of naming and recording all the Lepidoptera he saw and this carried on right up to the time of his death. These diaries in the distant future, will give a valuable insight into our world.

I first met Reg in 1981, with his faithful and attentive dog Jason in Kent on a quest for *Hydraecia osseola* (Staud.) (Marsh Mallow moth). We quickly became firm friends, visiting and entomologising together over many years, indeed for the rest of his life as he became more dependent on other people for his activities. It was on that first night that I realised that he had serious problems with mobility due to severe rheumatoid arthritis. This was to plague him for all his life as it led to increasing complications, some manifest and some occult, about which he did not want anyone to know. The greatest tribute that I can pay to him is that he never ever complained about his lot – ever. He had more reason to complain than anyone I had ever met. His GP would plead with him to sign himself permanently off work, but he preferred his independence.

The smartest thing he ever did was to marry Susan, "Suzy", as she was known to all of us, and she not only ran the household and brought up Felicity, their daughter, and stepson Glen, but became a proficient field worker in her own right. Many were the times when Suzy and Felicity went up into the mountains in Scotland on some task that Reg had set for them and almost invariably with success. It is to be greatly regretted that Suzy was diagnosed with a terminal illness in 2007 and died on the 4th August 2008. Reg did not get over the blow despite the solace that Felicity was able to give him.

Reg began his entomological career under the guidance of Denzil Ffennel, an old BENHS member who fired his interest on a fishing trip to the River Itchen, where they accidentally met in 1971. Denzil gave the good advice that he should not record outside his garden for the first year so he could gain some proficiency in identifying and he assisted with the more difficult species. Reg's ambition was to breed all the British macrolepidoptera that it was reasonable to breed and in this he largely succeeded. His meticulous voucher collection is being deposited with the Hampshire Museum Services where it will be well curated. During the last few years when mobility became a really serious problem, he did not take to his armchair but returned to his bird watching with the aim of photographing all the breeding British birds which he admirably pursued by getting a long distance lens and photographing them through his car window.

I hope that I have painted a picture in this obituary of a resolute and indefatigable naturalist who can be an example to us all in the pursuit of our interest and who stood and fought authority over the little things in life like careless untimely trimming of hedges, unnecessary mowing of roadside verges and spraying the environment with noxious chemicals. Felicity and Glen, his stepson, can be proud of him.

One final drama occurred at his committal, appropriately at the Hinton Park Woodland Burial Ground in the New Forest. It was a sunny calm day and at the graveside as the coffin was being lowered, three species of butterfly visited the wreaths around the grave, a Painted Lady, a Comma and a Common Blue. I looked up and overhead there wheeled two Buzzards, the subject of one of his finest photographs.

BRIAN ELLIOTT

THE PHYTOPHAGOUS BEETLES ASSOCIATED WITH A SERIES OF CALCAREOUS GRASSLANDS OF DIFFERENT AGES IN BUCKINGHAMSHIRE

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Calcareous grasslands are amongst the most diverse habitats in Britain and support some of the rarest British invertebrates (McLean, 1990). Conservation of this habitat, through the better management of existing grasslands and habitat restoration, is recognised as a priority by the British government (Anon., 1994). Phytophagous beetle assemblages have been shown to respond to the vegetation changes associated with old field succession, with diversity strongly correlated with plant diversity, and increasing levels of host-plant specialisation with age (Brown & Hyman, 1986).

Grasslands of four successional ages, ranging from recent arable reversion to ancient grassland were identified from the records of the National Trust's Bradenham estate in Buckinghamshire. Two grasslands of each age (all north of Bradenham Village SU 827972) were chosen for study based on ease of access. The vegetation of 2-year-old sites was dominated by short-lived forbs, the older sites by perennial grasses, with long-lived perennial forbs becoming more abundant with increased age. The ancient grasslands had been subject to scrub invasion, but sheep grazing was being reintroduced at the time of the study.

At each study site ten pitfall traps were set along a transect at 3m intervals. The preserving medium used was blue anti-freeze and the traps were serviced weekly from the 29 May–8 July 1997. At the initial sorting of the catch the beetles were separated and identified to family. Individuals of the phytophagous families Apionidae and Curculionidae (weevils) and Chrysomelidae (leaf beetles) were subsequently identified to species.

In this study, 244 weevils and leaf beetles were captured, comprising 34 species (see Table 1). Given the expected relationship between beetles and vegetation, it is slightly surprising that only ten of these 34 species were characteristic of calcareous grassland (Alexander, 2003). However, these ten species accounted for some 65% of the individuals captured, and characteristic beetle species were found on sites of all ages.

The true grassland assemblage was rather unexceptional and even those species associated with calcareous grasslands were generally of low habitat fidelity (Alexander, 2003). The only notable species recorded was *Stenocarus ruficornis* (Stephens) (treated as *S. umbrinus* (Gyllenhal) in Hyman & Parsons, 1992). This weevil is associated with poppies, and was recorded from one of the 2-year-old sites. At the other end of the age spectrum, one of the ancient grassland sites supported *Hermaeophaga mercurialis* (Fabr.), a species associated with Dog's Mercury and indicative of the decline of the grassland into scrub. While the relatively short sampling period makes it likely that not all of the species present were recorded, the under-management of the ancient grasslands and the length of time required to recreate grassland beetle communities (Woodcock *et al.*, 2008) probably explain this relatively impoverished fauna.

Table 1. The phytophagous beetles recorded from grassland sites of known age at Bradenham, Buckinghamshire, May–July 1997.

	2 years old		10 years old		30 years old		Ancient	
	A1	A2	B1	B2	C1	C2	D1	D2
Apionidae								
Ceratapion gibbirostre (Gyllenhal)					1			
Protapion apricans (Herbst)				1		7		
Protapion assimile (Kirby)								1
Holotrichapion pisi (Fabr.)						1		
Curculionidae								
Otiorhynchus singularis (L.)								2
Phyllobius roboretanus Gredler	1					1		3
Barypeithes pellucidus (Boheman)		1			1		4	3
Sciaphilus asperatus (Bonsdorff)							1	
Liophloeus tessulatus (Müller)		3		1	1	2	3	
Barynotus moerens (Fabr.)					2			1
**Barynotus obscurus* (Fabr.)	1				8	1	1	
Sitona hispidulus (Fabr.)		13	1			1		
**Sitona humeralis* Stephens		7	58	18		5		
Sitona lepidus Gyllenhal		1	1					
Sitona lineatus (L.)		1			1	2		
**Sitona sulcifrons* (Thunberg)				1		7	1	
**Hypera arator* (L.)						1		
**Hypera nigrirostris* (Fabr.)						1		
**Hypera postica* (Gyllenhal)		12	6	5	2	2		
**Hypera punctata* (Fabr.)		1						
Graptus triguttatus (Fabr.)						1		
Leiosoma deflexum (Panzer)				2				
Stenocarus ruficornis (Stephens)		1						
Glocianus distinctus (Brisout)	1					2		
Ceuthorhynchus pallidactylus (Marsham)				1				
**Tychius junceus* (Reich)			11	1	1	1		
**Mecinus pascuorum* (Gyllenhal)						1	1	
Chrysomelidae								
Chrysolina polita (L.)					1		2	
Neocrepidodera ferruginea (Scopoli)							1	
**Cryptocephalus moraei* (L.)				2		1		
Chaetocnema hortensis (Geoffroy)	1	2					1	
Hermaeophaga mercurialis (Fabr.)								5
Phyllotreta nodicornis (Marsham)					1			
Longitarsus melanocephalus (De Geer)	1							
No. individuals	5	42	77	32	20	37	16	15
No. species	5	10	5	9	11	17	10	6

Nomenclature follows Audisio (2007). Species marked with an asterisk are characteristic of calcareous grasslands (Alexander, 2003).

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Are major bird kills of bumblebees beneficial to bumblebee populations? – Badmin (2009) reported the finding of some 250 dead and mutilated queen bumblebees at Oare gravel pits, near Faversham, Kent in April 2008. He attributed their deaths to predation by local birds and posed the question whether birds are a cause of bumblebee decline in Britain. This note reports an almost identical occurrence a year later and some hundred miles away at Heyford Hill, on the southern boundary of the City of Oxford.

An area of unused land lies between my house and the Oxford ring-road (SP525028). It is separated from my house by a remnant of ancient woodland and covers some 3 hectares which can be divided into three distinct sub-areas: Area A – unimproved grassland, about 0.5 ha in area. Area B – predominantly mixed hawthorn, blackthorn and bramble scrub, with interspersed glades and immature ash and oak trees, about 2 ha in area. Area C – a mixture of rough grassland and coarse vegetation (largely nettles during the monitoring period but later redolent with hogweed and teasels) arising from a past small market gardening venture, about 0.5 ha in area.

Over the last twenty years I have regularly visited this site. The unimproved grassland is especially rich in butterflies and moths the most notable being colonies of the Marbled White butterfly and Narrow-bordered five-spot burnet moth. Bumblebees of a variety of species are also seen there each year.

On 19 March 2009, I was surprised to notice the corpses of three large bumblebees at approximately one metre intervals along the track way on the west edge of Area C. These were followed by a fourth, five metres further on. I returned later in the day to examine them more closely when I realised the posterior two segments of the abdomen, along with all the contents of the abdomen, were missing from each. A further quick search realised four more corpses in a similar condition within Area C. An intensive search of the whole area the next day produced 28 similar corpses, the majority were found in Area C although a few were found in Areas A and B. Thereafter the area was surveyed on an almost day basis for the next month and the total corpse count by this time (20 April) was 208. Owing to the damage they had suffered it was impossible to be certain of the identity of them all but the following tentative segregation was made (Table 1). The most frequently ‘predated’ species was *Bombus terrestris* (L.).

Regular monitoring ceased after 20 April owing to other commitments but occasional corpses were found and by early June, when the last one was found, the total had risen to about 230.

The amount of damage they had suffered was variable (Table 2) with only 7% intact and apparently showing no signs of either external or internal damage.

An accurate record was not kept of the distribution of the corpses between the three areas but the following estimate was made – Area A = 10%, Area B = 20% and Area C = 70%. It was noticed that the majority were found in more sparsely vegetated areas such as track ways, as were the first four found. This may have been because they were more noticeable in these situations but concerted efforts to find corpses in the coarser neighbouring vegetation were nearly always unsuccessful. The attitude of the corpses was interesting and about a third gave the impression of having nose-dived into the ground. About 15% of the "corpses" found still showed some residual signs of life with their limbs in futile movement. This movement continued for some time after the "corpses" were collected and in a couple of cases for a further 24 hours. Two were also capable of motion when first found – one walking very slowly forward and the other gave the appearance of trying to bury itself in the loose earth of a rabbit scrape. Fresher corpses were covered in mites and ants poured forth from older corpses when they were disturbed. Ants may have been responsible for some of the damage noticed in these older corpses.

Most deaths appeared to occur in the late morning. This tentative conclusion was confirmed on 7 April by four visits made to Area C at deliberately spaced intervals (Table 3).

A local aculeate specialist, Ivan Wright, was consulted and he visited the site on 23 March. From the evidence presented to him at that time he felt the cause of death was due to predation by local birds of live bumblebees. He took away the 50 or so corpses collected to that time for further examination and concluded, from wing length measurements, that they were all queens. Also, from specimens whose abdominal bands were still intact enough he concluded there was no evidence for *B. lucorum* (L.) being involved. He dissected the one intact corpse collected to that

Table 1. Species of bumblebee corpses found at Heyford Hill, Oxford, 2009

Species	Number	% of total
Bombus terrestris (L.)	172	83
Bombus pratorum (L.)	13	6
Bombus lapidarius (L.)	11	5
Bombus pascuorum (Scopoli)	6	3
Unidentifiable	6	3

Table 2. Levels of abdominal damage to bumblebees

Damage	Number	% of total
Intact	14	7
Less than half of abdomen case missing	103	50
Half or more than half of abdomen case missing	77	37
Abdomen spilt open	8	4
In disintegrated parts	7	3

Table 3. Bumblebee corpses observed during the day at Heyford Hill, 7 April 2009

Visit	Time	Corpses	Comments
1	07:45–08:15	1	Obviously a leftover from the previous day
2	10:15–10:45	0	
3	12:15–12:45	6	4 very fresh corpses
4	14:15–14:45	0	

time and found no evidence for the presence of the parasitic nematode, *Sphaerularia bombi* Dufour.

During the event I consulted four books on bumblebees and found only one to give any weight to predation by birds beyond bee-eaters, shrikes and spotted-flycatchers – all of which can be confidently ruled out as contributing to this event. Free & Butler (1959) say "Birds seem generally to avoid bumblebees" but add that they "have been recorded as prey of many different birds from time to time." Alford (1978) says "Although birds, such as great tits, sometimes attack drunken bumblebees foraging on lime trees, in more normal circumstances they tend to avoid them." Goulson (2003) says "most other insectivorous birds avoid bumblebees".

However, Benton (2006) has more to say. He mentions the lime tree associated phenomenon referred to by Alford including a personal observation on 3 July 2003. In this case he found several dozen bodies of worker bumblebees under an avenue of limes, whose nectar is considered to be a narcotic to bumblebees, with "the tips of their abdomens neatly snipped off and the abdominal contents removed". A much earlier incident in 1884 was attributed to red-backed shrikes but Benton says the 2003 one was probably due to blue or great tits. In support of this he states he has received one report of a great tit being observed pecking out the sting and consuming the body contents of a bumblebee. The narcotic influence of lime nectar can obviously be ruled out in this case owing to (a) the lack of local lime trees (b) the fact they do not flower until later in the summer.

In his species account for *B. lucorum*, Benson states "There is also a report of predation on queens by great tits, which were probably collecting them from cracks in the bark of a tree where they were spending the nights after hibernation. Later in the year they are among the species whose eviscerated carcasses can be found in considerable numbers under trees – presumably victims of predation by birds (probably blue or great tits)."

I took some time trying to establish which birds were responsible for the predation but was unsuccessful in observing a bird strike. There was considerable bird activity in the trees and scrub neighbouring Area C consisting mainly of great tits, blue tits, chaffinches, long-tailed tits and wrens. Green woodpeckers and jays also frequent the site. From the observations of others, it would seem great tits and blue tits are the most likely candidates. However, they are not ground feeders and the majority of the corpses found in Area C were remote from the surrounding trees. This apparent anomaly could be accounted for by the fact that 15% of the corpses found showed residual signs of life and it may be possible that they were still capable of limited flight after being attacked.

Why was Area C the favoured killing ground? There were no nectar sources to attract the bumblebees there. The only major nectar source on the site at the start of the monitoring period was a male *Salix spp* tree on the edge of the remnant

woodland on the southern edge of Area A and remote from Area C. Only two corpses were found in the vicinity of this tree which stopped attracting insects, including bumblebees, in the first few days of April when the blossom was over. Towards the end of the monitoring period *B. pascuorum* (L.) were found on a few occasions nectaring on ground ivy flowers within Area C.

The other possibility, based on the writings of Alford and Benton, is that there is a hibernation site within or near to Area C. The south-western corner of Area B, which abuts Area C, accords well with the criteria given by Alford (1969) for a hibernation site – north-west facing slope, shaded by trees (immature ash) and with sparse vegetation cover including moss. However, observations later in the summer never gave any evidence of returning bumblebees in the act of excavating their hibernation chambers, which Alford states as the best way to identify a hibernation site.

Another factor may be parasitisation of the hibernating queens by *Sphaerularia bombi*. This nematode is recognised as being a significant and widespread parasitoid of over-wintering bumblebees. Free & Butler (1959) state parasitized queens are "slower and more clumsy in flight" than un-parasitized individuals. Two active bumblebees were seen during the study period fitting this description. Parasitized bumblebees are presumably much more vulnerable to attack by birds and high parasitisation by *S. bombi* may also have contributed to the apparent success rate of the birds in this case. It is also known that *S. bombi* affects the behaviour of the bees, so after initial nectaring they attempt to go back into hibernation rather than trying to found a colony, this allows *S. bombi* to complete its life-cycle. The observation that many of the corpses appeared to have nose-dived into the ground may also be relevant. This could be interpreted as the final act of the violated bumblebees trying to return to hibernation. This would also account for so many of the corpses being found on track-ways (where patches of bare earth are prevalent). The perceived activity of the *B. pratorum* found on the 11 April would also support this.

The involvement of a hibernation site and parasitisation by *S. bombi* would also help explain why this phenomenon has not been observed before in the last twenty years. Possibly a hibernating site has been developing during this period, as the ash trees have grown, and has only become suitable towards the end of the period. Presumably new hibernation sites suffer from little or no infection by *S. bombi* which takes several years to build up.

Badmin (2009) reasonably suggests that bird kills of this size will probably have a negative effect on the local bumblebee population. However, if the bumblebees they are killing are heavily parasitized by *S. bombi* their actions could be seen as being beneficial in the long term to local bumblebee populations. They would be breaking the life cycle of *S. bombi* causing the hibernation site to be less heavily infected during the coming winter. — DAVID REDHEAD, 1 Heyford Hill Cottages, Heyford Hill Lane, Littlemore, Oxford OX4 4YJ, email: red.admiral@virgin.net

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CAUTIONARY TALES

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It is now approaching sixty years, to be exact 1951, that I have been sitting around mercury vapour light-traps, from my first occasion on Shoreham beach with my old mentor Len Savage, to my most recent, a few days ago on Hayling Island. During this long period, I have at times been advised that mv lights are a source of headaches, keratinised skin and possible problems with vision. Over most of this long period I have also been fortunate to be blessed with my own study. It was therefore a bit of a surprise this year to experience a couple of unfortunate accidents that are worth relating to the entomological fraternity. One of these in the former environment and one in the latter.

The first concerns a visit to the BENHS field meeting on 27 June of this year, led by Dr. Paul Waring at the BBOWT Warburg Reserve in the Chiltern Hills, to which I was looking forward to with pleasant anticipation, since not only did I enjoy my last visit there, but it was obviously going to be an optimum night. With this in mind, I went much higher up the reserve than Paul, setting up three light traps.

After a chat with Paul I set the traps running at 10.15 pm and was soon frantically writing down the names of the species pouring into the traps and at first I paid little attention to a commotion in my right ear into which, what seemed was quite a large moth, trying to insert itself. My first thought was that it would extricate itself as time went on, but this was not to be. I first sought the opinion and help of Paul since it was obviously by the feel of it, absolutely jammed in the external auditory meatus. Paul could not see anything, but did empathise since he had had the experience of a Tortrix in one of his ears so I decided to try and ignore it, and I returned to my recording. After a further half hour around the traps, the eardrum was getting painful with the struggles of the moth and I felt that I had better go and "do something about it" as I visualised medial and apical spurs digging into my eardrum.

My first attempt at help was a visit to Henley on Thames Hospital Casualty Department which was predictably shut, so I sat in the car park and decided that for starters, I had to kill the moth which I could feel was still alive. I did this by filling up my ear with water and lying on my side for ten minutes or so until movement subsided. After this I returned back to the Reserve having decided to go to the Royal Berkshire Hospital in Reading. I knew this hospital having done some training there in previous years.

Before packing up the traps, I made a record of all the species I could identify and took one or two I couldn't to examine later. (A measure of the night, was a count of some 170 species of Lepidoptera which I completed at 1.30 am. Would it have been 200 species if I had stayed all night?)

I then set off for the Royal Berkshire Hospital in Reading. Here due to an unfortunate admixture of roadworks and multiple direction signs, I was through the town before I realised so I decided to set off for the Casualty Department at Winchester Royal Hospital, which I knew quite well. Arriving here at about 3.45 am. I was pleased to find the place empty of the usual assortment of problems that casualty departments attract. An explanation of my predicament was greeted first by amusement and then curiosity as all and sundry trooped in to have a look with an Otoscope. Next, efforts to grasp it failed. Syringing (at my insistence) failed and so did a suction apparatus. With increasing pain due to the procedures, I decided to abandon treatment and headed for home, arriving at 5.00 am.

After a rest at home, my next idea was to try the Southampton Hospital and I duly presented with my problem at 9.30 am. Again, amusement followed by curiosity and failure to dislodge the beast ended in my being admitted to an ENT ward at midday. This time, a really powerful suction apparatus was tried and, like a cork in a bottle, the moth shot out of my ear, its abdominal contents evacuated by the suction. It was still recognisable as a female *Ochropleura plecta* (L.) (not as you would have expected one of the "Ear" moth group!)

This is not the first time that some lepidopterists have experienced this problem and in at least one other instance, the culprit was again *O. plecta*. So the moral of the story is: On optimum nights of high activity, some cotton wool in the ears would be a useful precaution.

My next problem manifested itself sometime during March when I began experiencing a degree of soreness and irritation in my right big toe. Being a microlepidopterist, I put it down to the usual problem of getting a thorn down my wellies when rummaging around in the undergrowth. I could see nothing visually so did what I usually do, which is to ignore it and let it manifest itself and then deal with it. By late May I was due to go on a holiday which involved a degree of walking so decided to have a poke around with sharp tweezers, but to no avail and even more discomfort. By the end of June, I was getting a number of subcutaneous haemorrhages which were causing the toe to go black and look very unpleasant so I decided to take it really seriously and find this thorn.

I found I could actually get my big toe on my study desk when standing up so as to get a magnifying lamp at it. Next an infiltration anaesthetic enabled me to start a thorough investigation of the likely area and after a while, thanks to the magnification, I was able to locate the foreign body and using fine pliers was able to withdraw it. It proved to be not a thorn, but an 010 setting pin which was twelve mm. long. I guess I had walked on it when it was stuck upright in the carpet after falling off the desk.

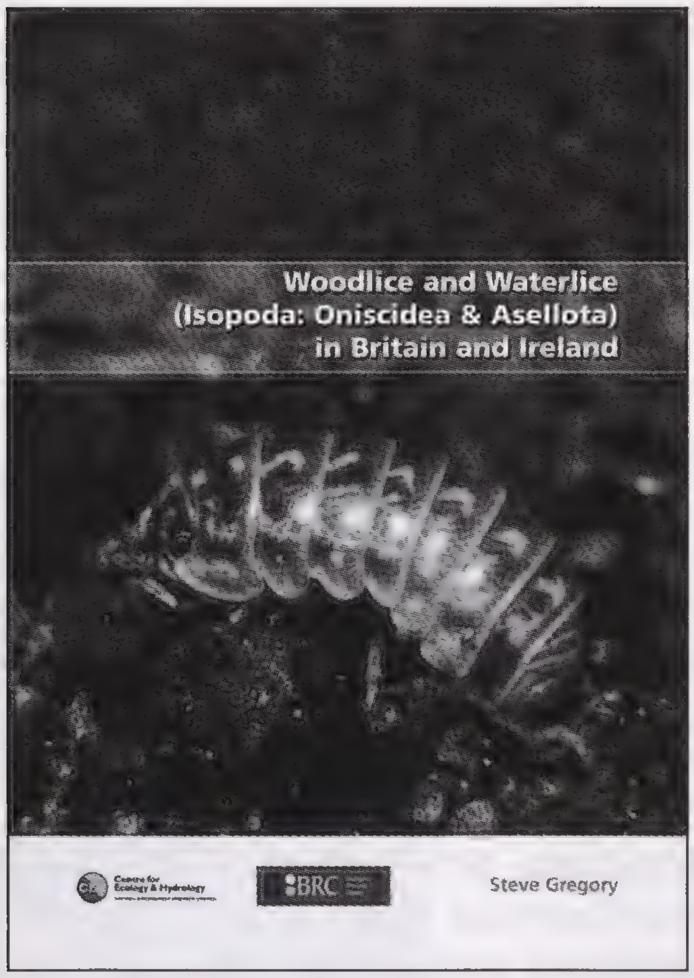
So, the moral of this particular story is: Don't walk around your study barefoot!

BOOK REVIEWS

Research on the natural heritage of the reserves Vincheto di Celarda and Val Tovanella (Belluno Province, Italy). Conservation of two protected areas in the context of a LIFE Project edited by S. Hardersen, F. Mason, F. Viola, D. Campedel, C. Lasen & M. Cassol. (Arti Grafiche Fiorini, Verona, 2008). €25. 461pp. ISBN 978-88-87082-98-2.

The National Centre for the Study and Conservation of Forest Biodiversity in Verona has been carrying out a series of studies of the wildlife of Italy's protected areas. This latest book, sumptuously illustrated, is the result of four year's research of two reserves, one located alongside the Piave River and the second in a secluded valley high in the Dolomites in the province of Belluno. The 33 original papers describe the insects, spiders, molluscs, fish, birds as well as the regional vegetation and hydrogeology. Most of the major insect Orders are covered particularly Coleoptera and Diptera with a paper on fungus gnats by our very own Peter Chandler. There is a checklist of butterflies for Vincheto di Celarda Nature Reserve The book is of course primarily of passing interest to British entomologists, but if you have an interest in the European fauna as a whole or intend to visit these sites then the book should be very useful. For me the most interesting paper was 'Ecological risk mapping in nature conservation and restoration plans' by Tommaso Sitzia.

John Badmin



Woodlice and Waterlice (Isopoda: Oniscoidea & Asellota) in Britain and Ireland by Steve Gregory. Published for the Biological Records Centre, Centre for Ecology & Hydrology, by the Field Studies Council, Shrewsbury, 2009, 175pp, 48 figures (40 coloured photographs), 53 maps. Softback. Price £19.50. ISBN 978 0 9557672 8 9.

The Field Studies Council established a reputation with its AIDGAP series of clearly illustrated identification manuals. Their recent collaboration with the Royal Entomological Society has revitalized that Society's series of *Handbooks for the Identification of British Insects* which now contain colour plates of the main genera covered.

The Royal Entomological Society has also adopted the illustrated colour cover and 245 × 175 mm format of the AIDGAP series. In 2008 the Field Studies Council combined with the Biological Records Centre to produce R. S. George's *Atlas of the Fleas (Siphonaptera) of Britain and Ireland* in the same format using larger distribution maps which are much clearer than those in earlier A5 Provisional Atlases. This latest BRC/ FSC publication interestingly does not include *Atlas* in its title, perhaps because it contains much more than a series of species maps each with the few lines of comment typical of earlier atlases. This high quality publication, liberally illustrated with colour photographs, replaces Harding & Sutton's (1985) *Woodlice in Britain and Ireland: Distribution and Habitat* and should prove to be a similar boost to the study of this distinctive and fascinating group of invertebrates.

The opening chapter provides a good general introduction to waterlice and woodlice and is followed by a history of woodlice recording in Britain from its beginnings in 1830 to the current studies by the Non-marine Isopod Recording Scheme, part of the British Myriapod and Isopod Group. Many useful references are provided for post-1985 additions to our woodlouse fauna and the systematic check-list includes corrections to earlier spelling mistakes and the most recently recognised synonyms. It includes four species of waterlice (Asellidae), 40 species of woodlice (Oniscoidae) and 12 glasshouse aliens. The bulk of this publication naturally comprises the distribution maps and species accounts. The three date classes used are unique to this publication and are defined by two pivotal dates: 1968, the inception of the Isopod Recording Scheme, and 1984, the cut-off date for records published in *Woodlice in Britain & Ireland.* Recent records are for the period up to the end of 2007. Although overall coverage is good, frequency of recording will always be patchy, reflecting recording effort, as exemplified by the concentration of Asellidae records from the East Midlands. Each species account typically extends to two pages and provides useful information on distinctive features and separation from similar species; distribution, range of habitats and microsites occupied; other notes, associated species and worldwide distribution. Although colour variations in *Armadillidium vulgare* are descibed and shown in that species' photographs, strangely no mention is made of similar colour forms in *Philoscia muscorum*, clearly illustrated in Sutton, Harding & Burns (1972) *Key to British Woodlice.* One may question the necessity for full size maps of the British Isles for the three species each

known from a single 10km grid square, but the main criticism of the maps lies in the use of such faint open circle symbols for 1968–1982 records. In poor light these are virtually invisible. Had the Luce Bay site for *Armadillidium album*, and the Slapton site for *Stenophiloscia glarearum,* not been mentioned in the text it is highly likely they would have not been noticed. A simple remedy would have been to highlight such isolated locations by means of an arrow, as used in the FSC's Flea Atlas. Maps in that publication also have larger dots, which are almost touching, together with more heavily printed open circle symbols. In the Waterlice and Woodlice maps the use of smaller dots and circles results in many records from coastal sites appearing to be offshore. This section ends with notes on the 12 alien woodlice which are not mapped, and gives references to the publications recording their introduction. The following chapter on habitats is essentially an updated version of that in Harding & Sutton (1985). Discussion on biogeography emphasizes how climatic history and man's activities, from Mesolithic traders to present day horticulturists, have influenced the composition of our woodlouse fauna. The conservation status of the British species is discussed and a table lists two Red Data Book species, 11 Nationally Scarce (formerly Nb), and four requiring reassessment. The final chapter covers collecting and recording, and recommended identification works including the AIDGAP *Key to the woodlice of Britain and Ireland* (Hopkins, 1991), for which this present volume proves to be an ideal companion. It has set a standard for compilers of future atlases to emulate.

R. COLIN WELCH

New members of the Society

Now that we no longer hold formal indoor meetings of the Society, the election of members to the Society is undertaken by Council at committee meetings. The following new members have joined the Society during the past year:

Mr A. G. Smith of Bristol; Louise Bacon of Cambourne, Cambs.; Tanya Houston of Charlton, London; Mr. E. A. Baker of Barry; Mrs. C. Cruickshank of Lincoln; Mr M. W. Dray of St. Leonards-on-Sea; Miss A. Rice of Preston; Mr I. Tew of Sketty, near Swansea; Mr J. D. G. Barnard of Canterbury; Dr A. R. Menzies of Chilmark, Wiltshire; Mr. M. B. R. Eagles of Dumfries; Caroline Falvey of North Yorkshire; Mr K. A. M. McGee of Aberystwyth; Dr Joanne Smith of Kintbury, Berks.; Mr P. J. Vincent of Eye, Suffolk; Mr R. J. Wheeler of Rushden, Northants., Mr T. D. Wilson of Peterborough and Kit Longden from London.

Need for a special NBN non-native species dictionary? – One of the actions arising from the intergovernmental agreement to halt biodiversity loss across the world is the implementation of procedures to restrict and monitor the movement of non-native species which can impact detrimentally on native wildlife. This November, an NBN conference was held in London specifically on the subject of non-native species. However it appears that many introduced taxa which have spread widely (e.g. horsechestnut scale *Pulvinaria regalis*) or are beginning to spread in the UK (elaeagnus psyllid *Cacopsylla fulguralis*) have no NBN code or no access page on the Gateway (e.g. southern green shieldbug *Nezara viridula*) and so cannot be monitored centrally. Surely we need a 'fast-track' system for allocating species codes in order to monitor their distribution in the UK right from the very start? – JOHN BADMIN (Editor's note).

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